

DEPARTMENT OF BIOLOGICAL SCIENCES

College of Arts and Sciences
 Department of Biological Sciences
 256 Cunningham Hall
 Kent Campus
 330-672-3613
 kentbiology@kent.edu
 www.kent.edu/biology

Undergraduate Programs

- Biology - B.A.
- Biology - B.S.
- Biotechnology - B.S.
- Botany - B.S.
- Environmental and Conservation Biology - B.S.
- Medical Technology - B.S.
- Zoology - B.S.

Minors

- Biological Sciences

Graduate Programs

- Biological Sciences - Botany - M.S.
- Biological Sciences - Botany - Ph.D.
- Biological Sciences - Cell Biology and Molecular Genetics - M.S.
- Biological Sciences - Cell Biology and Molecular Genetics - Ph.D.
- Biological Sciences - Ecology and Evolutionary Biology - M.S.
- Biological Sciences - Ecology and Evolutionary Biology - Ph.D.
- Biological Sciences - Integrative Physiology and Neurobiology - M.S.
- Biological Sciences - Integrative Physiology and Neurobiology - Ph.D.
- Biology - M.A.
- Biology - M.S.

Department of Biological Sciences Faculty

- Bade, Darren L. (2006), Associate Professor, Ph.D., University of Wisconsin, 2004
- Bagavandoss, Paul (1993), Associate Professor, Ph.D., University of Michigan-Ann Arbor, 1986
- Bahlai, Christine (2017), Assistant Professor, Ph.D., University Of Guelph, 2012
- Bailey, Erin L. (2012), Assistant Professor, Ph.D., Kent State University, 2001
- Blackwood, Christopher B. (2006), Professor, Ph.D., Michigan State University, 2001
- Blank, James L. (1986), Professor and College Dean, Ph.D., Indiana University, 1982
- Breidenbaugh, Caralisa (2010), Lecturer, M.S., Youngstown State University, 2008
- Brennan, Michael J. (2004), Associate Lecturer, M.Ed., Edinboro University of Pennsylvania, 1985
- Caldwell, Heather K. (2007), Professor, Ph.D., Georgia State University, 2004
- Carlson, Chris R. (1991), Associate Professor, M.S., Michigan State University, 1981
- Casadesus Smith, Gemma (2014), Associate Professor, Ph.D., Tufts University, 2003
- Case, Andrea L. (2005), Associate Professor, Ph.D., University of Toronto, 2000
- Chen, Yijing (2014), Assistant Professor, Ph.D., University of Wisconsin-Madison, 1997
- Chung, Wilson C. (2011), Associate Professor, Ph.D., University of Amsterdam, 2003
- Clements, Robert J. (1997), Assistant Professor, Ph.D., Kent State University, 2004
- Costello, David M. (2014), Assistant Professor, Ph.D., University of Notre Dame, 2010
- Damron, Derek S. (2007), Professor, Ph.D., Kent State University, 1991
- De Szalay, Ferenc A. (1997), Associate Professor, Ph.D., University of California-Berkeley, 1995
- Delorme, Thierry A. (2004), Associate Professor, Ph.D., University of Lyon, 1997
- Ding, Qunxing (2007), Associate Professor
- Engohang-Ndong, Jean (2010), Assistant Professor
- Finer, Kim R. (1993), Professor, Ph.D., Texas A&M University, 1984
- Fraizer, Gail C. (2001), Associate Professor, Ph.D., University of California-Berkeley, 1983
- Freeman, Ernest J. (1990), Associate Professor and School Director, Ph.D., Kent State University, 1991
- Gerbig, Donald G. (1996), Associate Professor, Ph.D., University of Tennessee-Knoxville, 1991
- Glass, David J. (1984), Professor
- Grafton, Brian W. (1994), Associate Professor, Ph.D., Kent State University, 2004
- Groff, Chi-Hua (2009), Assistant Professor, Ph.D., Wayne State University, 1997
- Gupta, Sanhita (2009), Assistant Professor, Ph.D., Case Western Reserve University, 1998
- Hamilton, Robert IV (2005), Associate Professor, Ph.D., Rutgers, State University of New Jersey, 2006
- Hoeh, Walter R. (1998), Associate Professor, Ph.D., University of Michigan-Ann Arbor, 1991
- Huang, Songping D. (1998), Professor, Ph.D., Michigan State University, 1993
- Johnson, John D. (2007), Associate Professor, Ph.D., University of Colorado-Boulder, 2002
- Kershner, Mark W. (1999), Associate Professor, Ph.D., The Ohio State University, 1998
- Kim, Min-Ho (2012), Assistant Professor, Ph.D., University of Toledo, 2002
- Kim, Woo-Yang, Associate Professor
- Kinsman-Costello, Lauren E. (2013), Assistant Professor, Ph.D., Michigan State University, 2012
- Kline, Douglas W. (1990), Professor, Ph.D., University of California-Davis, 1985
- Kooijman, Edgar (1998), Associate Professor, Ph.D., Utrecht University, 2006

- Koski, Gary K. (2010), Professor, Ph.D., Johns Hopkins University, 1995
- Kurokawa, Manabu (2017), Assistant Professor, Ph.D., Univ Of Massachusetts Amherst, 2004
- Leff, Adam A. (1994), Associate Professor, D.V.M., University of Georgia, 1991
- Leff, Laura G. (1994), Professor, Ph.D., University of Georgia, 1992
- Lehnert, Matthew S. (2012), Assistant Professor, Ph.D., University of Florida, 2010
- Lovell, John A. (1995), Associate Professor, Ph.D., Kent State University, 1993
- Marcinkiewicz, Jennifer L. (1995), Associate Professor
- McDonough, Jennifer A. (2006), Associate Professor
- Meek, Leah M. (1995), Associate Lecturer
- Mintz, Eric M. (2002), Professor, Ph.D., University of California-Santa Cruz, 1995
- Model, Michael A. (2002), Assistant Professor, Ph.D., University of Michigan-Ann Arbor, 1995
- Mou, Xiaozhen (2008), Associate Professor, Ph.D., University of Georgia, 2006
- Mueller, Devin , Associate Professor
- Naji, Josephine W. (1988), Associate Professor, Ph.D., Kent State University, 1994
- Novak-Barnett, Colleen M. (2009), Associate Professor, Ph.D., Michigan State University, 1999
- Piontkivska, Olena (2005), Associate Professor, Ph.D., Pennsylvania State University, 2003
- Popescu, Daniela C. (2013), Assistant Professor, Ph.D., Vanderbilt University, 2006
- Proffer, Tyre J. (1991), Professor, Ph.D., Michigan State University, 1985
- Redfearn, James C. (2006), Assistant Professor, Ph.D., Kent State University, 2016
- Rocha, Oscar J. (2004), Associate Professor, Ph.D., Pennsylvania State University, 1990
- Russell, Mary A. (2003), Associate Professor, Ph.D., The Ohio State University, 1996
- Shilling, Michael (2008), Assistant Professor, Ph.D., Kent State University, 2013
- Smith, Gregory A. (2014), Assistant Professor, Ph.D., University of Oklahoma, 2007
- Steele, Louise (2012), Assistant Professor, Ph.D., Case Western Reserve University, 2002
- Stone, Jonathan F. (2003), Assistant Professor, B.S., University of Akron, 1985
- Tinkler, Gregory P. (2013), Assistant Professor, Ph.D., Wake Forest University, 2005
- Vash, Sarah R. (2004), Senior Lecturer, M.S., Kent State University, 2003
- Veney, Sean L. (2004), Associate Professor, Ph.D., University of Virginia, 2000
- Vijayaraghavan, Srinivasan (1997), Professor
- Ward, David (2015), Professor, Ph.D., University of KwaZulu-Natal, 1988
- Welshhans, Kristy A. (2011), Assistant Professor, Ph.D., Georgia State University, 2008
- Zhu, Haiyan (2010), Assistant Professor, M.S., University of Kentucky, 1998

Biological Sciences (BSCI)

BSCI 10001 HUMAN BIOLOGY (KBS) 3 Credit Hours

Study of the scientific method and life's properties, emphasizing human biology. Topics include energy, genetics, reproduction, development disease, nutrition and physical fitness in humans. This course may not be used to fulfill major or minor requirements in the following programs: BA Biology, BS Biology, BS Botany, BS Environmental and Conservation Biology, BS Medical Technology, BS Biotechnology, BS Zoology, and the Biological Sciences minor.

Prerequisite: None.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

Attributes: Kent Core Basic Sciences, Transfer Module Natural Sciences

BSCI 10002 LIFE ON PLANET EARTH (KBS) 3 Credit Hours

Explores the fascinating breadth of life on Earth including the unique ecology and survival strategies of animals, plants and microbes in their natural habitats. This course may not be used to fulfill major or minor requirements in the following programs: BA Biology, BS Biology, BS Botany, BS Environmental and Conservation Biology, BS Medical Technology, BS Biotechnology, BS Zoology, and the Biological Sciences minor.

Prerequisite: None.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

Attributes: Kent Core Basic Sciences, Transfer Module Natural Sciences

BSCI 10003 LABORATORY EXPERIENCE IN BIOLOGY (KBS) (KLAB) 1 Credit Hour

Introductory college-level laboratory in biology for non-majors. This course may not be used to fulfill major or minor requirements in the following programs: BA Biology, BS Biology, BS Botany, BS Environmental and Conservation Biology, BS Medical Technology, BS Biotechnology, BS Zoology, and the Biological Sciences minor.

Pre/corequisite: BSCI 10001 or 10002.

Schedule Type: Laboratory

Contact Hours: 2 lab

Grade Mode: Standard Letter

Attributes: Kent Core Basic Sciences, Kent Core Basic Sciences Lab

BSCI 10005 ANATOMY FOR VETERINARY TECHNICIANS 5 Credit Hours

Comparison and identification of anatomy and basic physiological functions of domestic animals: skeletal, muscles, integumentary, special sense organs, respiratory, digestive, urinary, reproductive, mammary glands, endocrine, nerves, circulatory, immune. Lecture 4 hours, laboratory 3 hours weekly. This course may not be used to fulfill major or minor requirements in the following programs: BA Biology, BS Biology, BS Botany, BS Environmental and Conservation Biology, BS Medical Technology, BS Biotechnology, BS Zoology, and the Biological Sciences minor.

Prerequisite: None.

Schedule Type: Combined Lecture and Lab

Contact Hours: 5 other

Grade Mode: Standard Letter

BSCI 10110 BIOLOGICAL DIVERSITY (KBS) (KLAB) 4 Credit Hours

This introductory course examines the biodiversity of life from its origins to present-day prokaryotes and eukaryotes; their behavior, ecology, and reproduction. Students must earn a final grade of at least C- in order to meet prerequisites for selected upper-division BSCI courses.

Prerequisite: None.

Schedule Type: Laboratory, Lecture, Combined Lecture and Lab

Contact Hours: 3 lecture, 2 lab

Grade Mode: Standard Letter

Attributes: Kent Core Basic Sciences, Kent Core Basic Sciences Lab, TAG Science

BSCI 10120 BIOLOGICAL FOUNDATIONS (KBS) (KLAB) 4 Credit Hours

This introductory course examines the organization of life from subcellular biochemistry and molecular biology, to genetics, bioenergetics and system homeostasis. Three hours of lecture and three hours of lab weekly. Students must earn a final grade of at least C- in order to meet prerequisites for selected upper-division BSCI courses.

Prerequisite: None.

Schedule Type: Laboratory, Lecture, Combined Lecture and Lab

Contact Hours: 3 lecture, 3 lab

Grade Mode: Standard Letter

Attributes: Kent Core Basic Sciences, Kent Core Basic Sciences Lab, TAG Science

BSCI 10195 SPECIAL TOPICS IN BIOLOGY 1-3 Credit Hours

(Repeatable for credit) Selected subjects and/or themes in biology.

Prerequisite: Special approval.

Schedule Type: Lecture

Contact Hours: 1-3 lecture

Grade Mode: Standard Letter

BSCI 11010 FOUNDATIONAL ANATOMY AND PHYSIOLOGY I (KBS) (KLAB) 3 Credit Hours

Anatomy and physiology to include organization of the human body, cells, tissues, organs and systems, integumentary, skeletal, muscular and respiratory systems and overviews of the nervous and circulatory system. This course is taught on Kent State's regional campuses for associate degree programs. This course may not be used to fulfill major or minor requirements in the following programs: BA Biology, BS Biology, BS Botany, BS Environmental and Conservation Biology, BS Medical Technology, BS Biotechnology, BS Zoology, and the Biological Sciences minor.

Prerequisite: Special approval.

Schedule Type: Combined Lecture and Lab

Contact Hours: 2 lecture, 3 lab

Grade Mode: Standard Letter

Attributes: Kent Core Basic Sciences, Kent Core Basic Sciences Lab

BSCI 11020 FOUNDATIONAL ANATOMY AND PHYSIOLOGY II (KBS) (KLAB) 3 Credit Hours

Anatomy and physiology of the circulatory, digestive, urinary, nervous, endocrine and reproductive systems. This course is taught on Kent State's regional campuses for associate degree programs. This course may not be used to fulfill major or minor requirements in the following programs: BA Biology, BS Biology, BS Botany, BS Environmental and Conservation Biology, BS Medical Technology, BS Biotechnology, BS Zoology, and the Biological Sciences minor.

Prerequisite: BSCI 11010 and special approval.

Schedule Type: Combined Lecture and Lab

Contact Hours: 2 lecture, 3 lab

Grade Mode: Standard Letter

Attributes: Kent Core Basic Sciences, Kent Core Basic Sciences Lab

BSCI 16001 HORTICULTURAL BOTANY 3 Credit Hours

To provide students with an understanding of the basic anatomy and physiology and growth characteristics of plants. Offered only at the Geauga and Salem campuses. This course may not be used to fulfill major or minor requirements in the following programs: BA Biology, BS Biology, BS Botany, BS Environmental and Conservation Biology, BS Medical Technology, BS Biotechnology, BS Zoology, and the Biological Sciences minor.

Prerequisite: None.

Schedule Type: Laboratory, Lecture

Contact Hours: 2 lecture, 3 lab

Grade Mode: Standard Letter

BSCI 20019 BIOLOGICAL STRUCTURE AND FUNCTION 4 Credit Hours

Basic design of human systems emphasizing the physiochemical and cellular bases of organ-system structure, function and development.

This course may not be used to fulfill major or minor requirements in the following programs: BA Biology, BS Biology, BS Botany, BS Environmental and Conservation Biology, BS Medical Technology, BS Biotechnology, BS Zoology, and the Biology minor.

Prerequisite: None.

Schedule Type: Lecture

Contact Hours: 4 lecture

Grade Mode: Standard Letter

BSCI 20021 BASIC MICROBIOLOGY 3 Credit Hours

Principles of microorganisms having a direct relationship on the health and well-being of humans. This course may not be used to fulfill major or minor requirements in the following programs: BA Biology, BS Biology, BS Botany, BS Environmental and Conservation Biology, BS Medical Technology, BS Biotechnology, BS Zoology, and the Biological Sciences minor.

Prerequisite: BSCI 20019; or BSCI 21010; or BSCI 10005; or BSCI 11010; or ATTR 25057; or EXSC 25057; and CHEM 10050 or 10052 or 10055 or 10060.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 20022 BASIC MICROBIOLOGY LABORATORY 1 Credit Hour

Laboratory experience in microbiology. This course may not be used to fulfill major or minor requirements in the following programs: BA Biology, BS Biology, BS Botany, BS Environmental and Conservation Biology, BS Medical Technology, BS Biotechnology, BS Zoology, and the Biological Sciences minor.

Corequisite: BSCI 20021.

Schedule Type: Laboratory

Contact Hours: 3 lab

Grade Mode: Standard Letter

BSCI 20195 SPECIAL TOPICS IN BIOLOGY 1-3 Credit Hours

(Repeatable for credit) Selected subjects and/or themes in Biology.

Prerequisite: special approval.

Schedule Type: Lecture

Contact Hours: 1-3 lecture

Grade Mode: Standard Letter

BSCI 20196 INTRODUCTION TO INDIVIDUAL INVESTIGATION 1-2 Credit Hours

(Repeatable for credit) Introduction to research in the biological sciences under the direction of a BSCI faculty mentor. Departmental and faculty mentor approvals required.

Prerequisite: 8 hours of BSCI courses with a minimum grade of C (2.000) in those courses.

Schedule Type: Individual Investigation

Contact Hours: 1-2 other

Grade Mode: Satisfactory/Unsatisfactory-IP

BSCI 21010 ANATOMY AND PHYSIOLOGY I (KBS) (KLAB) 4 Credit Hours

Anatomy, physiological chemistry, cytology, tissues, and homeostatic mechanisms of the integumentary, skeletal, nervous, muscular, and sensory systems. This course may not be used to fulfill major or minor requirements in the following programs: BA Biology, BS Biology, BS Botany, BS Environmental and Conservation Biology, BS Medical Technology, BS Biotechnology, BS Zoology, and the Biological Sciences minor.

Prerequisite: None.

Schedule Type: Combined Lecture and Lab

Contact Hours: 3 lecture, 3 lab

Grade Mode: Standard Letter

Attributes: Kent Core Basic Sciences, Kent Core Basic Sciences Lab

BSCI 21020 ANATOMY AND PHYSIOLOGY II 4 Credit Hours

Anatomy and physiological processes as related to the following organ systems: endocrine, circulatory, respiratory, digestive, urinary and reproductive. This course may not be used to fulfill major or minor requirements in the following programs: BA Biology, BS Biology, BS Botany, BS Environmental and Conservation Biology, BS Medical Technology, BS Biotechnology, BS Zoology, and the Biological Sciences minor.

Prerequisite: BSCI 21010.

Schedule Type: Combined Lecture and Lab

Contact Hours: 3 lecture, 3 lab

Grade Mode: Standard Letter

BSCI 26002 ECOLOGICAL PRINCIPLES OF PEST MANAGEMENT 3 Credit Hours

Basic principles of integrated pest management, pesticide application, pest identification and environmental effects. Lecture three hours weekly; offered only at the Salem Campus. This course may not be used to fulfill major or minor requirements in the following programs: BA Biology, BS Biology, BS Botany, BS Environmental and Conservation Biology, BS Medical Technology, BS Biotechnology, BS Zoology, and the Biological Sciences minor.

Prerequisite: BSCI 16001.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 26003 PLANT IDENTIFICATION AND SELECTION I 3 Credit Hours

Identification and selection of horticulturally important plant species. Emphasis on woody species, shrubs and trees. Lecture two hours weekly, lab three hours weekly. Offered only at the Salem Campus. This course may not be used to fulfill major or minor requirements in the following programs: BA Biology, BS Biology, BS Botany, BS Environmental and Conservation Biology, BS Medical Technology, BS Biotechnology, BS Zoology, and the Biological Sciences minor.

Prerequisite: HORT 16001 and BSCI 16001.

Schedule Type: Laboratory, Lecture

Contact Hours: 2 lecture, 3 lab

Grade Mode: Standard Letter

BSCI 26004 PLANT IDENTIFICATION AND SELECTION II 3 Credit Hours

Identification and selection of horticulturally important plant species. Emphasis on herbaceous species, ground covers and vines. Lecture two hours weekly, lab three hours weekly. Offered only at the Salem Campus. This course may not be used to fulfill major or minor requirements in the following programs: BA Biology, BS Biology, BS Botany, BS Environmental and Conservation Biology, BS Medical Technology, BS Biotechnology, BS Zoology, and the Biological Sciences minor.

Prerequisite: BSCI 16001 and HORT 16001.

Schedule Type: Laboratory, Lecture

Contact Hours: 2 lecture, 3 lab

Grade Mode: Standard Letter

BSCI 30050 HUMAN GENETICS 3 Credit Hours

Modern concepts of genetics applicable to the human including examination of genetically related diseases and their societal implications. This course may not be used to fulfill major or minor requirements in the following programs: BA Biology, BS Biology, BS Botany, BS Environmental and Conservation Biology, BS Medical Technology, BS Biotechnology, BS Zoology, and the Biological Sciences minor.

Prerequisite: 8 credit hours of biology [BSCI] courses; and 3 credit hours of chemistry [CHEM] courses.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 30105 CAREER PATHWAYS IN BIOLOGY 1 Credit Hour

Orients students toward various career pathways in the biological sciences.

Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades.

Schedule Type: Lecture

Contact Hours: 1 lecture

Grade Mode: Satisfactory/Unsatisfactory

BSCI 30130 HUMAN PHYSIOLOGY 3 Credit Hours

Integrating mechanisms, pharmacological and pathological considerations for selected organ systems.

Prerequisite: BSCI 20019; or BSCI 10110 and BSCI 10120 with minimum C- grades; and 4 credit hours of chemistry [CHEM] courses.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 30140 CELL BIOLOGY 4 Credit Hours

Investigation of the cell as the fundamental unit of life with an emphasis on the relationship between cellular structure and function. Three-hour lecture and three-hour lab weekly.

Prerequisite: BSCI 10120 with a minimum grade of C-; and CHEM 10060 and 10062.

Schedule Type: Laboratory, Lecture, Combined Lecture and Lab

Contact Hours: 3 lecture, 3 lab

Grade Mode: Standard Letter

BSCI 30156 ELEMENTS OF GENETICS 3 Credit Hours

Principles of organic mechanisms for expression and transmission of traits as studied in molecules, cells, organisms and populations.

Prerequisite: BSCI 10110 and 10120 with minimum C- grades; and MATH 10772 or MATH 10775 or MATH11009 or MATH 11010 or MATH 12001 or MATH 12002 or MATH 12021.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 30157 GENETICS LABORATORY 1 Credit Hour

Consists of hands-on experiments with modern computational and molecular biology experimental approaches.

Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades.

Corequisite: BSCI 30156.

Schedule Type: Laboratory

Contact Hours: 3 lab

Grade Mode: Standard Letter

BSCI 30171 GENERAL MICROBIOLOGY 4 Credit Hours

Fundamental principles of microbiology and of organisms including their structure, physiology, genetics, pathogenicity, classification, mechanisms of cultivation and control. Lecture three hours, lab three hours weekly.

Prerequisite: BSCI 10110 with a minimum grade of C-; and BSCI 30140; and CHEM 10060, 10061, 10062 and 10063.

Schedule Type: Laboratory, Lecture, Combined Lecture and Lab

Contact Hours: 3 lecture, 1 lab

Grade Mode: Standard Letter

BSCI 30267 PLANT PHYSIOLOGY 4 Credit Hours

Introduction to biochemical processes in plants and plant cells. How plants grow and maintain their bodies through dynamic interactions with the environment. Lecture three hours weekly, lab two hours weekly.

Prerequisite: BSCI 10120, CHEM 10060 and 10062

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 3 lab

Grade Mode: Standard Letter

BSCI 30270 GENERAL PLANT BIOLOGY 3 Credit Hours

Covers all topics in modern plant biology, including molecular and cellular biology, physiology, anatomy, development, ecology, evolution and diversity.

Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 30271 GENERAL PLANT BIOLOGY LABORATORY 1 Credit Hour

Laboratory and greenhouse exercises in general plant biology.

Corequisite: BSCI 30270

Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades.

Schedule Type: Laboratory

Contact Hours: 1 lab

Grade Mode: Standard Letter

BSCI 30274 FORESTRY 3 Credit Hours

Management of the forest resource within appropriate environmental constraints for sustained use relative to watershed protection, lumber production, recreation and wildlife.

Prerequisite: BSCI 10110 and 10120 with minimum C- grades.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 30275 LOCAL FLORA (ELR) 4 Credit Hours

Identification and field study of local plants: native, naturalized and cultivated. Two-hour lecture and six-hour lab weekly.

Prerequisite: BSCI 10110 and 10120 with minimum C- grades.

Schedule Type: Laboratory, Lecture

Contact Hours: 2 lecture, 6 lab

Grade Mode: Standard Letter

Attributes: Experiential Learning Requirement

BSCI 30277 ECONOMIC BOTANY 2 Credit Hours

Biology of plants important to man and their relation to climate and geography.

Prerequisite: BSCI 10110 and 10120 with minimum C- grades.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 30360 GENERAL ECOLOGY 4 Credit Hours

Principles of ecology based on field studies of local plant and animal communities. Lecture three hours, lab three hours weekly.

Prerequisite: BSCI 10110 and 10120 with minimum C- grades.

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 1 lab

Grade Mode: Standard Letter

BSCI 30361 BIOGEOGRAPHY 3 Credit Hours

Geographical distribution of biotic communities with special reference to North America and to their environmental control.

Prerequisite: BSCI 10110 and 10120 with minimum C- grades.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 30362 INTRODUCTION TO BIOLOGY OF THE TROPICS 3 Credit Hours

Biology and conservation of tropical ecosystems and organisms.

Prerequisite: BSCI majors and Junior or Senior standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 30517 HUMAN ANATOMY 4 Credit Hours

An intensive investigation of the anatomy and development of the human body.

Prerequisite: Senior standing and special approval.

Schedule Type: Combined Lecture and Lab

Contact Hours: 3 lecture, 3 lab

Grade Mode: Standard Letter

BSCI 30518 VERTEBRATE ANATOMY 4 Credit Hours

Concepts and methods of functional morphology. Comparative study of vertebrate organs and systems: skeletal, muscular, digestive, respiratory, circulatory, urogenital, nervous and endocrine. Lecture three hours, lab three hours weekly.

Prerequisite: BSCI 10110 or 10120 with a minimum grade of C-

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 1 lab

Grade Mode: Standard Letter

BSCI 30519 VERTEBRATE EMBRYOLOGY AND DEVELOPMENTAL ANATOMY 4 Credit Hours

Gametogenesis, fertilization, embryogenesis, organogenesis, normal/abnormal embryological development; emphasizing mammal; amphibian, bird illustrating general principles and concepts. Laboratory studies of frog, chick, pig developmental anatomy. Three one hour lectures and one three hour lab.

Prerequisite: BSCI 20001 or 30518 and 30140.

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 1 lab

Grade Mode: Standard Letter

BSCI 30520 INTRODUCTION TO NEUROSCIENCE 3 Credit Hours

Basic principles in neuroscience from the cellular to systems level. Covers how the nervous system is organized, how it detects sensory stimuli to create a mental representation of their environment and output pathways by which the nervous system can control movement, hormone levels and physiological processes.

Prerequisite: BSCI 30140.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 30560 INVERTEBRATE ZOOLOGY 4 Credit Hours

Survey of the animal kingdom emphasizing evolutionary developments. Three-hour lecture and three-hour lab weekly.

Prerequisite: BSCI 10110 and 10120 with minimum C- grades.

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 3 lab

Grade Mode: Standard Letter

BSCI 30580 ENTOMOLOGY 4 Credit Hours

Classification, biology and ecology of the principal groups of insects. Lecture three hours, lab three hours weekly.

Prerequisite: BSCI 10110 and 10120 with minimum C- grades; and 10 hours of biology (BSCI) courses.

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 1 lab

Grade Mode: Standard Letter

BSCI 30582 ORNITHOLOGY 4 Credit Hours

Field study of natural history of local birds. Lecture three hours, lab three hours weekly.

Prerequisite: BSCI 10110 and 10120 with minimum C- grades.

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 1 lab

Grade Mode: Standard Letter

BSCI 40020 BIOLOGY OF AGING 3 Credit Hours

(Slashed with BSCI 50020) Current theories of aging; changes at the cellular level associated with aging in humans; course covers the normal aging process, dysfunction, and diseases of the elderly categorized by body systems. This course may not be used to fulfill major or minor requirements in the following programs: BA Biology, BS Biology, BS Botany, BS Environmental and Conservation Biology, BS Medical Technology, BS Biotechnology, BS Zoology, and the Biological Sciences minor.

Prerequisite: BSCI 20019; or BSCI 21010 and BSCI 21020; or BSCI 11010 and BSCI 11020; or ATTR 25057 and ATTR 25058; or EXSC 25057 and EXSC 25058.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40104 INTRODUCTION TO BEEKEEPING 2 Credit Hours

(Cross-listed with BSCI 50104) Covers basic beekeeping practices and provides students with an in-depth understanding of the honey bee colony through participation in hands-on activities, observation and experimentation.

Prerequisite: BSCI 10110 and 10120 with minimum C- grades; and Junior or Senior standing.

Schedule Type: Combined Lecture and Lab

Contact Hours: 1 lecture, 2 lab

Grade Mode: Standard Letter

BSCI 40142 BIOENERGETICS 3 Credit Hours

(Cross-listed with BSCI 50142 and BSCI 70142) Lecture and discussion of respiration and photosynthesis, their origin, development and control in living systems. Concepts are introduced from fundamental principles. Lecture three hours weekly.

Prerequisite: BSCI 30140 and CHEM 20481 or 30481.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40143 EUKARYOTIC CELL BIOLOGY 3 Credit Hours

Current survey of the structure and function of eukaryotic cells, including recent advances in research technology. Lecture three hours weekly.

Prerequisite: BSCI 30140 and CHEM 20481 or 30481.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40146 DEVELOPMENTAL BIOLOGY 3 Credit Hours

(Cross-listed with BSCI 50146 and BSCI 70146) Fundamental concepts and paradigms of development as exemplified by major model organisms. Examines our modern understanding of the molecular, cellular and genetic basis of developmental biology.

Prerequisite: Senior standing, B or better in BSCI 30156 and BSCI 30140.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40147 DEVELOPMENTAL NEUROBIOLOGY 3 Credit Hours

(Slashed with BSCI 50147 and BSCI 70147) Covers fundamental principles in developmental neurobiology, including molecular and cellular processes involved in the formation of the vertebrate central nervous system.

Prerequisite: BSCI 30140 and Junior standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40148 PRINCIPLES OF INFECTIOUS DISEASE 3 Credit Hours
 (Slashed with BSCI 50148 and BSCI 70148) Basic principles of infectious disease, with emphasis on major human pathogens including protozoa, bacteria, and viruses. Topics include infection establishment, spread within the host, pathology, immunity, and host behavior.
Prerequisite: BSCI 30171; and CHEM 10060; and CHEM 10061; and CHEM 10062; and CHEM 10063.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

BSCI 40150 MOLECULAR MECHANISMS OF DISEASE: CANCER 3 Credit Hours
 (Cross-listed with BSCI 50150 and BSCI 70150) Explores the current understanding of molecular and cellular mechanisms of disease processes, including new technologies and modern strategies in the forefront of future biomedical research. Emphasis on a review of primary literature.
Prerequisite: Junior or Senior standing; BSCI 30156 and BSCI 30140.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

BSCI 40151 MECHANISMS OF DISEASE: OBESITY AND RELATED METABOLIC DISEASES 3 Credit Hours
 (Slashed with BSCI 50151 and BSCI 70171) Addresses obesity from multiple angles, including health and disease process, underlying physiology and cell and molecular biology, and the role of behavior. Emphasis on a review of primary literature to discuss obesity causes, consequences, and treatments.
Prerequisite: BSCI 10120 with a minimum C- grade; and BSCI 30130 or BSCI 40430.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

BSCI 40152 MOLECULAR MECHANISMS OF DISEASE: NEUROLOGICAL DISORDERS 3 Credit Hours
 (Slashed with BSCI 50152 and BSCI 70152) Major concepts and theoretical principles underlying neurological disorders.
Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades and Junior standing.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

BSCI 40154 DIABETES AND CARDIOVASCULAR DISEASE 3 Credit Hours
 (Slashed with BSCI 50154 and BSCI 70154) Physiological aspects of diabetes and cardiovascular disease, including associated pathologies and therapies.
Prerequisite: BSCI 40430; or BSCI 30140 and BSCI 30130.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

BSCI 40157 NEUROBIOLOGY OF DRUG ADDICTION 3 Credit Hours
 (Slashed with BSCI 50157 and BSCI 70157) Introduction to neural structures, circuitry, and chemistry underlying drug addiction, main categories of drugs of abuse, and how brain cells and circuits are modified in response to addictive drugs.
Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades and Junior standing.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

BSCI 40158 MOLECULAR BIOLOGY 3 Credit Hours
 Molecular genetics, DNA and RNA structure, chromosomes, DNA replication, recombination, genetic transcription and translation, gene expression, current concepts and technologies.
Prerequisite: BSCI 30140 and 30156.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

BSCI 40159 MOLECULAR BIOLOGY LABORATORY (ELR) (WIC) 3 Credit Hours
 Experience in research methods for studying cellular and molecular processes in plant and animal systems.
Prerequisite: BSCI 30140 and 30156.
Schedule Type: Laboratory
Contact Hours: 6 lab
Grade Mode: Standard Letter
Attributes: Experiential Learning Requirement, Writing Intensive Course

BSCI 40160 MARINE BIOLOGY 3 Credit Hours
 (Slashed with BSCI 50160 and BSCI 70160) Natural history and ecology of marine organisms, with emphasis on life in coastal habitats.
Prerequisite: BSCI 10110 and BSCI 10120 with minimum C-grades.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

BSCI 40162 SOIL BIOLOGY 3 Credit Hours
 (Slashed with BSCI 50162 and BSCI 70162) The ecology and physiology of organisms that live in soil, including microbes, plants and animals. The physical and chemical aspects of soil are introduced to understand how organisms in soils impact nutrient cycles and ecosystem development.
Prerequisite: Junior or Senior standing and BSCI 10110 and BSCI 10120 with minimum C- grades.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

BSCI 40163 EVOLUTION 3 Credit Hours
 (Cross-listed with BSCI 50163 and BSCI 70163) History of evolutionary theory, the evidences of evolution, the evolutionary forces and the products of these forces. Lecture three hours weekly.
Prerequisite: BSCI 30156 and 4 hours of biology (BSCI) courses.
Schedule Type: Lecture
Contact Hours: 3 lecture
Grade Mode: Standard Letter

BSCI 40166 ENVIRONMENTAL SENSOR TECHNOLOGY 2 Credit Hours

(Slashed with BSCI 50166 and BSCI 70166) Provides learning experiences in the field of environmental wireless sensor technology for performing both isolated and collaborative tasks. Students will use practical tools for WST design.

Prerequisite: Special approval.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 40170 STREAM BIOLOGY 3 Credit Hours

(Slashed with BSCI 50170 and BSCI 70170) Identification, biology and ecology of stream-inhabiting organisms. Lecture two hours, lab three hours weekly.

Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades.

Schedule Type: Laboratory, Lecture

Contact Hours: 2 lecture, 1 lab

Grade Mode: Standard Letter

BSCI 40174 IMMUNOLOGY 3 Credit Hours

(Cross-listed with BSCI 50174 and BSCI 70174) Survey of the mammalian host responses to self and non-self with emphasis on the cellular and molecular mechanisms by which innate and acquired immunity result. Experimental design and data analyses are related to current methodologies used to study immunology. Lectures 3 hours weekly.

Prerequisite: BSCI 30171 and CHEM 10060, 10061, 10062 and 10063.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40191 SENIOR SEMINAR 1 Credit Hour

(Repeatable for credit) A capstone seminar course to examine biological topics and scientific contributions across subdisciplines. Discussion of current problems in the biological sciences related to societal needs and concerns.

Prerequisite: Biology (BSCI) major and Senior standing.

Schedule Type: Seminar

Contact Hours: 1 other

Grade Mode: Satisfactory/Unsatisfactory

BSCI 40192 INTERNSHIP IN BIOLOGICAL SCIENCES (ELR) 3-12 Credit Hours

(Repeatable for credit) Work experience and training in the biological sciences under the supervision of appropriate personnel in a government agency, nonprofit organization or business. Maximum of 4 credit hours to count toward BSCI degrees as upper division elective hours.

Prerequisite: 18 hours of biology and 2.750 minimum GPA in biology (BSCI) coursework and special approval.

Schedule Type: Practicum or Internship

Contact Hours: 3-12 other

Grade Mode: Standard Letter

Attributes: Experiential Learning Requirement

BSCI 40193 VARIABLE TITLE WORKSHOP IN BIOLOGICAL SCIENCES 1-6 Credit Hours

(Repeatable for credit) Topics to be offered will meet specific needs in the biological sciences. S u graded.

Prerequisite: Permission.

Schedule Type: Workshop

Contact Hours: 1-6 other

Grade Mode: Satisfactory/Unsatisfactory

BSCI 40195 SPECIAL TOPICS IN BIOLOGY 1-3 Credit Hours

(Repeatable for credit) (Cross-listed with BSCI 50195 and BSCI 70195) Special topics in biology.

Prerequisite: 18 hours of biology (BSCI) coursework and special approval of instructor.

Schedule Type: Laboratory, Lecture

Contact Hours: 1-3 lecture, 2-6 lab

Grade Mode: Standard Letter-IP

BSCI 40196 INDIVIDUAL INVESTIGATION (ELR) 1-3 Credit Hours

(Repeatable for credit) Research study under the direction of a BSCI faculty mentor. May be repeated; however, a maximum of 6 credit hours count toward BSCI degrees as upper-division elective hours. Departmental and faculty mentor approvals required.

Prerequisite: A minimum BSCI grade average of 2.750 and at least 18 credit hours of BSCI coursework.

Schedule Type: Individual Investigation

Contact Hours: 1-3 other

Grade Mode: Standard Letter-IP

Attributes: Experiential Learning Requirement

BSCI 40199 SENIOR HONORS THESIS (ELR) 1-10 Credit Hours

(Repeatable for credit) Honors thesis research project completed during the senior year with BSCI faculty mentor and research committee. Maximum of 4 credit hours to count toward BSCI degrees as upper division elective hours.

Prerequisite: Departmental faculty mentor and honors college approval.

Schedule Type: Senior Project/Honors Thesis

Contact Hours: 1-10 other

Grade Mode: Standard Letter-IP

Attributes: Experiential Learning Requirement

BSCI 40220 BIOINFORMATICS 3 Credit Hours

(Cross-listed with BTEC 40220) Analysis of biological databases, including nucleic acid and protein sequence searching, multiple sequence alignment, protein classification, phylogenetic analysis, comparative genomics, proteomics and protein structure analysis.

Prerequisite: BSCI 30140 and BSCI 30156 and BSCI 40158.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40221 ECOLOGICAL GENOMICS 3 Credit Hours

(Slashed with BSCI 50221 and BSCI 70221) Covers principles, concepts and techniques of ecological genomics, emphasizing the application of genomics to ecology and biogeochemistry and using genomic, metagenomic and metatranscriptomic data.

Prerequisite: BSCI 30140; and BSCI 30156; and BSCI 30360.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40242 SEMINAR ON MEDICAL PRACTICE FOR UNDERSERVED POPULATIONS 2 Credit Hours

(Slashed with BSCI 50242). Course will introduce students to primary care and medical practice in rural and urban settings. Physicians and other healthcare practitioners from rural and urban settings will serve as invited speakers in this seminar. Preference for registration will be given to students following the Baccalaureate-MD program with junior standing and minimum 3.500 overall GPA.

Prerequisite: Special approval.

Schedule Type: Seminar

Contact Hours: 2 other

Grade Mode: Satisfactory/Unsatisfactory

BSCI 40272 PLANT ANATOMY 4 Credit Hours

(Slashed with BSCI 50272 and BSCI 70272) Development and structure of cells, tissues and tissue systems of seed plants. Both vegetative and reproductive structures of angiosperms will be emphasized. Lecture two hours, lab six hours weekly.

Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades.

Schedule Type: Laboratory, Lecture

Contact Hours: 2 lecture, 6 lab

Grade Mode: Standard Letter

BSCI 40273 INTRODUCTION TO MYCOLOGY 3 Credit Hours

(Slashed with BSCI 50273 and BSCI 70273) Introduces key features defining the fungi. Topics include anatomical and morphological features, reproductive strategies, identification, and community interactions.

Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40274 PLANT COMMUNITIES OF OHIO 3 Credit Hours

(Slashed with BSCI 50274 and BSCI 70274) Designed to familiarize students with the range of plant communities within Ohio by relating plant identification to biological, hydrological, geological, and climatic forces.

Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40275 PLANT SYSTEMATICS AND EVOLUTION 4 Credit Hours

(Slashed with BSCI 50275 and BSCI 70275) Introduction to vascular plant diversity, with a focus on flowering plants. Students will learn characteristics of vascular plants and how to identify major plant groups. Lecture three hours weekly, lab two hours weekly.

Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades.

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 1 lab

Grade Mode: Standard Letter

BSCI 40292 INTERNSHIP IN PRIMARY CARE FOR THE UNDERSERVED (ELR) 2 Credit Hours

(Slashed with BSCI 50292) Students will be placed in internships in urban or rural healthcare settings. Registration preference will be given to students following the Baccalaureate/M.D. pathway and who have junior standing and a minimum 3.500 overall GPA.

Prerequisite: Special approval.

Schedule Type: Practicum or Internship

Contact Hours: 6 other

Grade Mode: Standard Letter

Attributes: Experiential Learning Requirement

BSCI 40341 STEM CELL BIOLOGY: PRINCIPLES AND APPLICATIONS 3 Credit Hours

(Slashed with BSCI 50341 and BSCI 70341) Examination of stem cells from various tissues, molecular mechanism of stem cell differentiation, and use of stem cells in clinical applications.

Prerequisite: BSCI 30140.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40360 ICHTHYOLOGY 4 Credit Hours

Basic biology, natural history, behavior and ecology of the fishes. Three hour lecture and three hour lab weekly.

Prerequisite: Junior standing, grade of C- or better in both BSCI 10110 and BSCI 10120.

Schedule Type: Combined Lecture and Lab

Contact Hours: 3 lecture, 3 lab

Grade Mode: Standard Letter

BSCI 40363 MICROBIAL ECOLOGY 3 Credit Hours

(Slashed with BSCI 50363 and BSCI 70363) Microbial interactions with their biotic and abiotic environment; control of distribution and physiological activities; biochemical cycles; current techniques; emphasis on bacteria in aquatic systems.

Prerequisite: BSCI 30171 and BSCI 30360.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40364 LIMNOLOGY 3 Credit Hours

(Cross-listed with BSCI 50364 and BSCI 70364) The study of the principles of aquatic ecology with emphasis on lakes and reservoirs.

Prerequisite: BSCI 30360.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40365 FIELD METHODS IN ORNITHOLOGY 3 Credit Hours

(Slashed with BSCI 50365 and BSCI 70365) Habitat-based survey of Ohio birds. Field-based lectures and activities cover location, observation and identification of birds and their songs, as well as bird ecology and behavior.

Prerequisite: BSCI 10110 and 10120 with minimum C- grades.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40368 WETLAND ECOLOGY AND MANAGEMENT (ELR) 4 Credit Hours

(Slashed with BSCI 50368 and BSCI 70368) Lecture, laboratory and field study of the principles of wetland ecology including adaptations of the biota to environmental conditions, comparison among different wetland habitat types and habitat management. Lecture 3 hours, lab 3 hours weekly.

Prerequisite: BSCI 10110 and 10120 with minimum C- grades; and 10 hours of biology (BSCI) coursework.

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 1 lab

Grade Mode: Standard Letter

Attributes: Experiential Learning Requirement

BSCI 40374 CONSERVATION BIOLOGY (ELR) 4 Credit Hours

(Cross-listed with BSCI 50374 and BSCI 70374) Provides a critical analysis of the factors that threaten biological diversity in the biosphere and the consequences on biological processes and quality of life.

Prerequisite: BSCI 30360.

Schedule Type: Lecture

Contact Hours: 4 lecture

Grade Mode: Standard Letter

Attributes: Experiential Learning Requirement

BSCI 40375 ENVIRONMENTAL BIOLOGY AND MANAGEMENT 4 Credit Hours

(Slashed with BSCI 50375 and BSCI 70375) Introduction to current concepts in applied ecology and ecosystem management. Students will learn aspects of ecosystem management and restoration including: 1) how environmental factors affect organism survival and ecosystem structure, 2) how human impacts such as pollution, habitat fragmentation, introduction of invasive species affect ecosystems, and 3) the use of ecological principles and methods to restore and manage ecosystems.

Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades; and BSCI 30360.

Schedule Type: Lecture

Contact Hours: 4 lecture

Grade Mode: Standard Letter

BSCI 40376 TROPICAL FIELD BIOLOGY AND CONSERVATION (ELR) 5 Credit Hours

(Slashed with BSCI 50376 and BSCI 70376) Introduction to major issues in tropical ecology and conservation including the threats to the biological diversity of tropical ecosystems resulting from human activities. Students learn how to apply modern field-observation techniques to generate and test problem-solving hypotheses.

Prerequisite: Junior or Senior standing; and BSCI 10110 and BSCI 10120 with minimum C- grades.

Schedule Type: Combined Lecture and Lab

Contact Hours: 3 lecture, 6 lab

Grade Mode: Standard Letter

Attributes: Experiential Learning Requirement

BSCI 40430 ANIMAL PHYSIOLOGY 3 Credit Hours

Physiologic principles and concepts.

Prerequisite: BSCI 30140; CHEM 10060, 10061, 10062 and 10063.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40431 NEUROENDOCRINOLOGY 2 Credit Hours

Integrative processes of how the central nervous system (primarily the hypothalamus) regulates autonomic, reproductive and metabolic activities, and how peripheral endocrine signals regulate brain activity.

Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 40432 ENDOCRINOLOGY 3 Credit Hours

(Cross-listed with BSCI 50432 and BSCI 70432) Principles of endocrine regulation of physiological and metabolic processes. Morphological and functional interrelationships between systems. Lecture three hours.

Prerequisite: BSCI 30130 or BSCI 40430.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40433 MAMMALIAN PHYSIOLOGY I 3 Credit Hours

Physiology of the endocrine, nervous, and reproductive systems.

Prerequisite: BSCI 30140 and CHEM 10060 and CHEM 10061 and CHEM 10062 and CHEM 10063; and CHEM 20481 or 30481.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40434 MAMMALIAN PHYSIOLOGY II 3 Credit Hours

Physiology of cardiovascular, renal, respiratory and digestive systems. Lecture three hours.

Prerequisite: BSCI 30140 and CHEM 10060 and CHEM 10061 and CHEM 10062 and CHEM 10063; and CHEM 20481 or 30481.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40450 BIOLOGICAL CLOCKS 2 Credit Hours

(Cross-listed with BSCI 50450 and BSCI 70450) Topics covered include the characteristics of biological clocks, their ecology, molecular biology, and neurobiology, the function and organization of sleep, and the medical implications of biological rhythmicity.

Prerequisite: BSCI 30156; and BSCI 30520 or 40430 or 40433 or PSYC 41363.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 40460 ADVANCED HUMAN PHYSIOLOGY 3 Credit Hours

(Slashed with BSCI 50460 and BSCI 70460) Major concepts and theoretical principles of human physiology, including nervous, endocrine, cardiovascular, respiratory, renal, gastrointestinal and reproductive systems.

Prerequisite: BSCI 30140 and Junior standing.

Corequisite: BSCI 40462.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40462 ADVANCED HUMAN PHYSIOLOGY: READINGS AND CASE STUDIES 1 Credit Hour

(Slashed with BSCI 50462 and BSCI 70462) Designed to complement the lecture course in Advanced Human Physiology. Students will read primary literature in physiology and work independently and in groups to apply their knowledge to solving case studies.

Prerequisite: BSCI 30140 and Junior standing.

Corequisite: BSCI 40460.

Schedule Type: Lecture

Contact Hours: 1 lecture

Grade Mode: Standard Letter

BSCI 40463 MEDICAL BIOTECHNOLOGY 3 Credit Hours

(Slashed with BSCI 50463 and BSCI 70463) (Cross-listed BTEC 40463) Medical Biotechnology provides a basic understanding of how living cells and cellular materials can be used for medical applications, particularly in the diagnosis and therapy of human diseases.

Prerequisite: BSCI 30140.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40515 ANIMAL BEHAVIOR 3 Credit Hours

Explores the evolution of various animal behaviors, the functions they might serve, and the interplay among the social, ecological and physiological mechanisms that regulate their occurrence.

Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades; and 6 additional hours of biology (BSCI) courses.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40517 MEDICAL HISTOLOGY 3 Credit Hours

(Slashed with BSCI 50517 and BSCI 70517) Study of the microscopic and submicroscopic structure of the human body in relation to function. Lecture two hours, lab three hours weekly.

Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades; and BSCI 30140.

Schedule Type: Laboratory, Lecture

Contact Hours: 2 lecture, 3 lab

Grade Mode: Standard Letter

BSCI 40519 HORMONES AND BEHAVIOR 3 Credit Hours

(Slashed with BSCI 50519 and BSCI 70519) Current concepts of hormone and behavior interactions across species.

Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades and Junior standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 40520 BEHAVIORAL EVOLUTION (WIC) 3 Credit Hours

(Cross-listed with BSCI 50520 and BSCI 70520) Examination of how behavior contributes to survival and reproduction in an ecological context. We consider how behavior may have evolved in a wide range of animals.

Prerequisite: BSCI 40163.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

Attributes: Writing Intensive Course

BSCI 40525 WILDLIFE RESOURCES (ELR) 3 Credit Hours

(Slashed with BSCI 50525 and BSCI 70525) Ecological parameters are discussed relative to the preservation and management of wild animal populations. Aesthetic, economic and environmental values are discussed. Lecture three hours weekly.

Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades; plus 4 hours of biology (BSCI) coursework.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

Attributes: Experiential Learning Requirement

BSCI 40556 VERTEBRATE ZOOLOGY 4 Credit Hours

(Slashed with BSCI 50556 and BSCI 70556) Field approach to identification and natural history of all Ohio vertebrates except birds. Lecture three hours, lab and field three hours weekly.

Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades; and 4 hours of biology (BSCI) coursework.

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 3 lab

Grade Mode: Standard Letter

BSCI 40581 ANIMAL PARASITOLOGY 4 Credit Hours

(Slashed with BSCI 50581) Morphology, physiology, life-histories, systematics and economic importance of parasites. Lecture two hours lab, six hours weekly.

Prerequisite: BSCI 10110 and BSCI 10120 with minimum C- grades; and 4 hours of biology (BSCI) coursework.

Schedule Type: Laboratory, Lecture

Contact Hours: 2 lecture, 6 lab

Grade Mode: Standard Letter

BSCI 40600 WRITING IN THE BIOLOGICAL SCIENCES (WIC) 1 Credit Hour

Writing-intensive course taken with a 3- or 4-credit-hour upper-division biology course. This course may be used to satisfy the writing-intensive course requirement with approval of major department.

Prerequisite: Biology (BSCI) major and Junior standing.

Schedule Type: Lecture

Contact Hours: 1 lecture

Grade Mode: Standard Letter

Attributes: Writing Intensive Course

BSCI 41110 BIOPHOTONICS 3 Credit Hours

(Slashed with BSCI 51110; Cross-listed with CHEM 41010 and CHEM 41010 and PHY 41010 and PHY 51010). Interdisciplinary overview of the basics of biophotonics; application of biophotonic techniques to probe biological samples. Introduction to the foundations of optics and photonics and how the molecular structure of organic molecules translates into unique photonic properties and targeting in biological cells or tissue. Preparation of fluorescent materials, advanced spectroscopy and cell visualization using regular and confocal fluorescence microscopy.

Prerequisite: Special approval.

Schedule Type: Combined Lecture and Lab

Contact Hours: 1 lecture, 6 lab

Grade Mode: Standard Letter

BSCI 41120 BIOLOGICAL LIGHT MICROSCOPY 3 Credit Hours

(Slashed with BSCI 51120 and BSCI 71120) Theoretical and practical information on the operation of optical microscopes, the application of transmission and fluorescence microscopy to biological specimens, and analysis of microscopic images.

Prerequisite: BSCI 30140.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50020 BIOLOGY OF AGING 3 Credit Hours

(Cross-listed with BSCI 40020) Current theories of aging; changes at the cellular level associated with aging in humans; course covers the normal aging process, dysfunction, and diseases of the elderly by body systems.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50104 INTRODUCTION TO BEEKEEPING 2 Credit Hours

Covers basic beekeeping practices and provides students with an in-depth understanding of the honey bee colony through participation in hands-on activities, observation and experimentation. This course may not be used to fulfill degree requirements in the MS or MA Biology programs.

Prerequisite: Graduate standing.

Schedule Type: Combined Lecture and Lab

Contact Hours: 1 lecture, 2 lab

Grade Mode: Standard Letter

BSCI 50105 CAREER PATHWAYS IN BIOLOGY 1 Credit Hour

This course orients students to graduate studies and to various career pathways in the biological sciences. Students will learn about a variety of possible careers, and prepare application materials needed to enter the workforce or apply to additional graduate programs.

Prerequisite: Graduate Standing and special approval.

Schedule Type: Lecture

Contact Hours: 1 lecture

Grade Mode: Satisfactory/Unsatisfactory

BSCI 50142 BIOENERGETICS 3 Credit Hours

(Cross-listed with BSCI 40142 and BSCI 70142) Lecture and discussion of respiration and photosynthesis, their origin development and control in living systems. Concepts are introduced from fundamental principles. Lecture three hours weekly.

Prerequisite: BSCI 40430 and Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50143 EUKARYOTIC CELL BIOLOGY 3 Credit Hours

(Cross-listed with BSCI 40143 and BSCI 70143) Current survey of the structure and function of eukaryotic cells, including recent advances in research technology. Lecture three hours weekly.

Prerequisite: BSCI 40430 and Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50146 DEVELOPMENTAL BIOLOGY 3 Credit Hours

(Cross-listed with BSCI 40146 and BSCI 70146) Fundamental concepts and paradigms of development as exemplified by major model organisms. This course will examine our modern understanding of the molecular, cellular and genetic basis of developmental biology.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50147 DEVELOPMENTAL NEUROBIOLOGY 3 Credit Hours

(Slashed with BSCI 40147 and BSCI 70147) Covers fundamental principles in developmental neurobiology, including molecular and cellular processes involved in the formation of the vertebrate central nervous system.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50148 PRINCIPLES OF INFECTIOUS DISEASE 3 Credit Hours

(Slashed with BSCI 40148 and BSCI 70148) Basic principles of infectious disease, with emphasis on major human pathogens including protozoa, bacteria, and viruses. Topics include infection establishment, spread within the host, pathology, immunity, and host behavior.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50150 MOLECULAR MECHANISMS OF DISEASE: CANCER 3 Credit Hours

(Cross-listed with BSCI 40150 and BSCI 70150) Explores the current understanding of molecular and cellular mechanisms of disease processes, including new technologies and modern strategies in the forefront of future biomedical research. Emphasis on a review of primary literature.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50151 MECHANISMS OF DISEASE: OBESITY AND RELATED METABOLIC DISEASES 3 Credit Hours

(Cross-listed with BSCI 40151 + BSCI 70171) Addresses obesity from multiple angles, including health and disease process, underlying physiology and cell and molecular biology, and the role of behavior. Emphasis on a review of primary literature to discuss obesity causes, consequences and treatments.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50152 MOLECULAR MECHANISMS OF DISEASE: NEUROLOGICAL DISORDERS 3 Credit Hours

(Slashed with BSCI 40152 and BSCI 70152) Major concepts and theoretical principles underlying neurological disorders.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50154 DIABETES AND CARDIOVASCULAR DISEASE 3 Credit Hours

(Slashed with BSCI 40154 and BSCI 70154) This course covers physiological aspects of diabetes and cardiovascular disease, including associated pathologies and therapies.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50157 NEUROBIOLOGY OF DRUG ADDICTION 3 Credit Hours

(Slashed with BSCI 40157 and BSCI 70157) Introduction to neural structures, circuitry, and chemistry underlying drug addiction, main categories of drugs of abuse, and how brain cells and circuits are modified in response to addictive drugs.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50158 MOLECULAR BIOLOGY 3 Credit Hours

(Cross-listed with BSCI 40158 and BSCI 70158) Molecular genetics, DNA and RNA structure, chromosomes DNA replication, recombination, genetic transcription and translation, gene expression, current concepts and technologies.

Prerequisite: BSCI 30156 and Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50159 MOLECULAR BIOLOGY LABORATORY 3 Credit Hours

(Cross-listed with BSCI 40159 and BSCI 70159) Experience in research methods for studying cellular and molecular processes in plant and animal systems.

Prerequisite: Graduate standing and special approval from instructor.

Schedule Type: Laboratory

Contact Hours: 9 lab

Grade Mode: Standard Letter

BSCI 50160 MARINE BIOLOGY 3 Credit Hours

(Cross-listed with BSCI 40160 and BSCI 70160) Natural history and ecology of marine organisms, with emphasis on life in coastal habitats. Lecture three hours weekly.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50162 SOIL BIOLOGY 3 Credit Hours

(Cross-listed with BSCI 40162 and BSCI 70162) The ecology and physiology of organisms that live in soil, including microbes, plants and animals. The physical and chemical aspects of soil are introduced to understand how organisms in soils impact nutrient cycles and ecosystem development.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50163 EVOLUTION 3 Credit Hours

Discussion of the history of evolutionary theory, the evidence of evolution the evolutionary forces and the products of those forces.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50166 ENVIRONMENTAL SENSOR TECHNOLOGY 2 Credit Hours

(Slashed with BSCI 40166 and BSCI 70166) Provides learning experiences in the field of environmental wireless sensor technology for performing both isolated and collaborative tasks. Students will use practical tools for WST design.

Prerequisite: Graduate standing and special approval.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 50170 STREAM BIOLOGY 3 Credit Hours

(Cross-listed with BSCI 40170 and BSCI 70170) Identification, biology and ecology of stream-inhabiting organisms. Lecture two hours, laboratory three hours weekly. Graduate standing.

Prerequisite: BSCI 10181 and 10182 .

Schedule Type: Laboratory, Lecture

Contact Hours: 2 lecture, 1 lab

Grade Mode: Standard Letter

BSCI 50174 IMMUNOLOGY 3 Credit Hours

(Cross-listed with BSCI 40174 and BSCI 70174) Survey of the mammalian host responses to self and non-self with emphasis on the cellular and molecular mechanisms by which innate and acquired immunity result. Experimental design and data analyses are related to current methodologies used to study immunology. Lecture three hours weekly. Graduate standing.

Prerequisite: BSCI 30171 and CHEM 10060, 10061 and 10062.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50193 VARIABLE TITLE WORKSHOP IN BIOLOGICAL SCIENCES 1-6 Credit Hours

(Repeatable for credit) Topics to be offered will meet specific needs in the biological sciences.

Prerequisite: Permission and Graduate standing.

Schedule Type: Workshop

Contact Hours: 1-6 other

Grade Mode: Satisfactory/Unsatisfactory

BSCI 50195 SPECIAL TOPICS IN BIOLOGY 1-3 Credit Hours

(Repeatable for credit) (Cross-listed with BSCI 40195 and BSCI 70195) Special topics in biology.

Prerequisite: Special approval of instructor and Graduate standing.

Schedule Type: Laboratory, Lecture

Contact Hours: 1-3 lecture, 2-6 lab

Grade Mode: Standard Letter-IP

BSCI 50196 INDIVIDUAL INVESTIGATION 1-3 Credit Hours

(Repeatable for credit) (Cross-listed with BSCI 40196 and BSCI 70196) Individual investigation in biology.

Prerequisite: Special approval of instructor and graduate standing.

Schedule Type: Individual Investigation

Contact Hours: 1-3 other

Grade Mode: Standard Letter-IP

BSCI 50221 ECOLOGICAL GENOMICS 3 Credit Hours

(Slashed with BSCI 40221 and BSCI 70221) Covers principles, concepts and techniques of ecological genomics, emphasizing the application of genomics to ecology and biogeochemistry and using genomic, metagenomic, and metatranscriptomic data.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50242 SEMINAR ON MEDICAL PRACTICE FOR UNDERSERVED POPULATIONS 2 Credit Hours

(Slashed with BSCI 40242). Course will introduce students to primary care and medical practice in rural and urban settings. Physicians and other healthcare practitioners from rural and urban settings will serve as invited speakers in this seminar. Preference for registration will be given to students following the MA-MD program.

Prerequisite: Graduate standing and special approval.

Schedule Type: Seminar

Contact Hours: 2 other

Grade Mode: Satisfactory/Unsatisfactory

BSCI 50272 PLANT ANATOMY 4 Credit Hours

(Cross-listed with BSCI 40272 and BSCI 70272) Development and structure of cells, tissues and tissue systems of seed plants. Both vegetative and reproductive structures of angiosperms will be emphasized. Lecture two hours, laboratory six hours weekly.

Prerequisite: Graduate standing.

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 1 lab

Grade Mode: Standard Letter

BSCI 50273 INTRODUCTION TO MYCOLOGY 3 Credit Hours

(Slashed with BSCI 40273 and BSCI 70273) Introduces the key features defining the fungi. Topics include anatomical and morphological features, reproductive strategies, identification, and community interactions.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50274 PLANT COMMUNITIES OF OHIO 3 Credit Hours

(Slashed with BSCI 40274 and BSCI 70274) Designed to familiarize students with the range of plant communities within Ohio by relating plant identification to biological, hydrological, geological, and climatic forces.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50275 PLANT SYSTEMATICS AND EVOLUTION 4 Credit Hours

(Cross-listed with BSCI 40275 and BSCI 70275) Introduction to vascular plant diversity, with a focus on flowering plants. Students will learn characteristics of vascular plants and how to identify major plant groups. Lecture three hours weekly, lab two hours weekly.

Prerequisite: Graduate standing.

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 1 lab

Grade Mode: Standard Letter

BSCI 50292 INTERNSHIP IN PRIMARY CARE FOR THE UNDERSERVED 2 Credit Hours

Students will be placed in internships in urban or rural healthcare settings. Preference will be given to students following the MA-MD program.

Prerequisite: Graduate Standing and special approval.

Schedule Type: Practicum or Internship

Contact Hours: 6 other

Grade Mode: Standard Letter

BSCI 50341 STEM CELL BIOLOGY: PRINCIPLES AND APPLICATIONS 3 Credit Hours

(Slashed with BSCI 40341 and BSCI 70341) Examination of stem cells from various tissues, molecular mechanism of stem cell differentiation, and use of stem cells in clinical applications.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50360 ICHTHYOLOGY 4 Credit Hours

(Cross-listed with BSCI 40360 and 70360) Basic biology, natural history, behavior and ecology of the fishes. Three hour lecture and three hour lab weekly.

Prerequisite: Graduate standing.

Schedule Type: Combined Lecture and Lab

Contact Hours: 3 lecture, 3 lab

Grade Mode: Standard Letter

BSCI 50363 MICROBIAL ECOLOGY 3 Credit Hours

(Cross-listed with BSCI 40363 and BSCI 70363) Microbial interactions with their biotic and abiotic environment; control of distribution and physiological activities; emphasis on bacteria in aquatic systems. Graduate standing.

Prerequisite: BSCI 30171, 30360.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50364 LIMNOLOGY 3 Credit Hours

(Cross-listed with BSCI 40364 and BSCI 70364) The study of the principles of aquatic ecology with emphasis on lakes and reservoirs.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50365 FIELD METHODS IN ORNITHOLOGY 3 Credit Hours

(Slashed with BSCI 40365 and BSCI 70365) Habitat-based survey of Ohio birds. Field-based lectures and activities cover location, observation and identification of birds and their songs, as well as bird ecology and behavior.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50368 WETLAND ECOLOGY AND MANAGEMENT 4 Credit Hours

(Cross-listed with BSCI 40368 and BSCI 70368) Lecture, laboratory and field study of the principles of wetland ecology including adaptations of the biota to environmental conditions, comparison among different wetland habitat types and habitat management. Lecture 3 hours lab 3 hours weekly.

Prerequisite: Graduate standing.

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 1 lab

Grade Mode: Standard Letter

BSCI 50370 ECOLOGICAL AND EVOLUTIONARY GENETICS 2 Credit Hours

(Cross-listed with BSCI 70370) Genetic and genomic approaches to studying ecology and evolution in populations and communities.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 50371 EVOLUTIONARY BIOLOGY 2 Credit Hours

(Cross-listed with BSCI 70371) Theoretical and experimental approaches to studying evolution from genes to populations and communities.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 50372 COMMUNITIES AND ECOSYSTEMS 2 Credit Hours

(Cross-listed with BSCI 70372) Theory and experimental approaches to studying community and ecosystem ecology.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 50373 POPULATION AND COMMUNITY ECOLOGY 2 Credit Hours

(Cross-listed with BSCI 70373) Theory and experimental approaches to studying population and community ecology.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 50374 CONSERVATION BIOLOGY 4 Credit Hours

(Cross-listed with BSCI 40374 and BSCI 70374) Provides a critical analysis of the factors that threaten biological diversity in the biosphere and the consequences on biological processes and quality of life.

Prerequisite: BSCI 30360 and Graduate standing.

Schedule Type: Lecture

Contact Hours: 4 lecture

Grade Mode: Standard Letter

BSCI 50375 ENVIRONMENTAL BIOLOGY AND MANAGEMENT 4 Credit Hours

(Cross-listed with BSCI 40375 and BSCI 70375) Introduction to current concepts in applied ecology and ecosystem management.

Students will learn aspects of ecosystem management and restoration including: 1) how environmental factors affect organism survival and ecosystem structure, 2) how human impacts such as pollution, habitat fragmentation, introduction of invasive species affect ecosystems, and 3) the use of ecological principles and methods to restore and manage ecosystems.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 4 lecture

Grade Mode: Standard Letter

BSCI 50376 TROPICAL FIELD BIOLOGY AND CONSERVATION 5 Credit Hours

(Cross-listed with BSCI 40376 and BSCI 70376) Introduction to major issues in tropical ecology and conservation including the threats to the biological diversity of tropical ecosystems resulting from human activities. Students learn how to apply modern field-observation techniques to generate and test problem-solving hypotheses.

Prerequisite: Graduate standing.

Schedule Type: Combined Lecture and Lab

Contact Hours: 3 lecture, 6 lab

Grade Mode: Standard Letter

BSCI 50432 ENDOCRINOLOGY 3 Credit Hours

(Cross-listed with BSCI 40432 and BSCI 70432) Principles of endocrine regulation of physiological and metabolic processes. Morphological and functional interrelationships between systems. Lecture three hours weekly.

Prerequisite: BSCI 40430 and Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50433 MAMMALIAN PHYSIOLOGY I 3 Credit Hours

Physiology of the endocrine, nervous, and reproductive systems.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50434 MAMMALIAN PHYSIOLOGY II 3 Credit Hours

Physiology of cardiovascular, renal, respiratory and digestive systems. Lecture three hours.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50450 BIOLOGICAL CLOCKS 2 Credit Hours

(Cross-listed with BSCI 40450 and BSCI 70450) Topics covered include the characteristics of biological clocks, their ecology, molecular biology, and neurobiology, the function and organization of sleep, and the medical implications of biological rhythmicity. Students enrolling at the graduate level should have some background in neurobiology and genetics.

Prerequisite: Graduate standing.

Corequisite: BSCI 50451.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 50451 CURRENT TOPICS IN BIOLOGICAL CLOCKS RESEARCH 1 Credit Hour

(Cross-listed with BSCI 70451) Discussion of current research literature in the area of research on biological clocks.

Prerequisite: Graduate standing.

Corequisite: BSCI 50450.

Schedule Type: Seminar

Contact Hours: 1 lecture

Grade Mode: Standard Letter-S/U

BSCI 50460 ADVANCED HUMAN PHYSIOLOGY 3 Credit Hours

(Slashed with BSCI 40460 and BSCI 70460) Major concepts and theoretical principles of human physiology, including nervous, endocrine, cardiovascular, respiratory, renal, gastrointestinal and reproductive systems.

Prerequisite: Graduate standing.

Corequisite: BSCI 50462.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50462 ADVANCED HUMAN PHYSIOLOGY: READINGS AND CASE STUDIES 1 Credit Hour

(Slashed with BSCI 40462 and BSCI 70462) Designed to complement the lecture course in Advanced Human Physiology. Students will read primary literature in physiology and work independently and in groups to apply their knowledge to solving case studies.

Prerequisite: Graduate standing.

Corequisite: BSCI 50460.

Schedule Type: Lecture

Contact Hours: 1 lecture

Grade Mode: Standard Letter

BSCI 50463 MEDICAL BIOTECHNOLOGY 3 Credit Hours

(Slashed with BSCI 40463 and BSCI 70463) (Cross-listed with BTEC 40463) Medical Biotechnology provides a basic understanding of how living cells and cellular materials can be used for medical applications, particularly in the diagnosis and therapy of human diseases.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50515 ANIMAL BEHAVIOR 3 Credit Hours

Explores the evolution of various animal behaviors, the functions they might serve, and the interplay among the social, ecological and physiological mechanisms that regulate their occurrence.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50517 MEDICAL HISTOLOGY 3 Credit Hours

(Cross-listed with BSCI 40517 and BSCI 70517) Study of the microscopic and submicroscopic structure of the human body in relation to function. Lecture two hours, laboratory three hours weekly.

Prerequisite: Graduate standing.

Schedule Type: Laboratory, Lecture

Contact Hours: 2 lecture, 3 lab

Grade Mode: Standard Letter

BSCI 50519 HORMONES AND BEHAVIOR 3 Credit Hours

(Cross-listed with BSCI 40519 and BSCI 70519) Current concepts of hormone and behavior interactions across species.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50520 BEHAVIORAL EVOLUTION 3 Credit Hours

(Cross-listed with BSCI 40520 and BSCI 70520) Examination of how behavior contributes to survival and reproduction in an ecological context. We consider how behavior may have evolved in a wide range of animals. Students enrolled at the graduate level in the course are expected to have had a course in evolution.

Prerequisite: Graduate standing and special approval.

Corequisite: BSCI 50522.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50522 READINGS IN BEHAVIORAL EVOLUTION 1 Credit Hour

(Cross-listed with BSCI 70522) Graduate reading course designed to give experience leading discussions and writing proposals. Students enrolled at the graduate level are expected to have had a course in evolution.

Prerequisite: Graduate standing and special approval.

Corequisite: BSCI 50520.

Schedule Type: Seminar

Contact Hours: 1 other

Grade Mode: Standard Letter-S/U

BSCI 50525 WILDLIFE RESOURCES 3 Credit Hours

(Cross-listed with BSCI 40525 and BSCI 70525) Ecological parameters are discussed relative to the preservation and management of wild animal populations. Aesthetic economic and environmental values are discussed. Lecture three hours weekly.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 50556 VERTEBRATE ZOOLOGY 4 Credit Hours

(Cross-listed with BSCI 40556 and BSCI 70556) Field approach to identification and natural history of all Ohio vertebrates except birds. Lecture three hours, laboratory and field three hours weekly.

Prerequisite: 4 hours of biology and Graduate standing.

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 3 lab

Grade Mode: Standard Letter

BSCI 50581 ANIMAL PARASITOLOGY 4 Credit Hours

Morphology, physiology, life-histories, systematics and economic importance of parasites. Lecture two hours, lab six hours weekly.

Prerequisite: Graduate standing.

Schedule Type: Combined Lecture and Lab

Contact Hours: 2 lecture, 6 other

Grade Mode: Standard Letter

BSCI 51110 BIOPHOTONICS 3 Credit Hours

(Slashed with BSCI 41110; Cross-listed with CHEM 41010 and CHEM 51010 and PHY 41010 and PHY 51010) Interdisciplinary overview of the basics of biophotonics and application of biophotonic techniques to probe biological samples. Introduction to the foundations of optics and photonics and how the molecular structure of organic molecules translates into unique photonic properties and targeting in biological cells or tissue. Preparation of fluorescent materials, advanced spectroscopy and cell visualization using regular and confocal fluorescence microscopy.

Prerequisite: Graduate standing and special approval.

Schedule Type: Combined Lecture and Lab

Contact Hours: 1 lecture, 6 lab

Grade Mode: Standard Letter

BSCI 51120 BIOLOGICAL LIGHT MICROSCOPY 3 Credit Hours

(Slashed with BSCI 41120 and BSCI 71120) Theoretical and practical information on the operation of optical microscopes, the application of transmission and fluorescence microscopy to biological specimens, and analysis of microscopic images.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 60080 EXPERIMENTAL METHODS IN BIOLOGY 2 Credit Hours

The development of hypotheses, principles of experimental design and methods of gathering and evaluating data.

Prerequisite: Special approval and Graduate standing.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 60103 BIOLOGICAL STATISTICS 3 Credit Hours

(Slashed with BSCI 70103) Principles of experimental design and statistical analysis and how to choose and interpret statistical tests using biological data sets.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 60144 SELECTED READINGS IN EUKARYOTIC CELL BIOLOGY 1 Credit Hour

(Cross-listed with BSCI 70144) Directed readings in cell and molecular biology from the primary and review literature will be presented and discussed by the students. Corequisite: BSCI 50143

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 1 lecture

Grade Mode: Standard Letter

BSCI 60145 MEDICAL GENOMICS 3 Credit Hours

(Cross-listed with BSCI 80145) Explores the relationship and contribution of genetics and genomics to healthcare issues, including disease susceptibility and therapeutic efficacy. Up-to-date genomics concepts and their applications to health care and the challenges of personalized medicine including genetic analyses (e.g., linkage and estimating population risks), ethical issues in genetic testing and therapy, genetic basis of disease processes (e.g., neurological, cardiovascular and neoplastic diseases) and epigenetic processes (that may link the environment to the risk of chronic diseases) are covered. This course requires an understanding of genetics and physiology; students should contact the Department of Biological Sciences to determine if they have the requisite prior training.

Prerequisite: Graduate standing and special approval.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 60184 RESPONSIBLE CONDUCT IN RESEARCH AND TEACHING-BIOLOGICAL SCIENCES 2 Credit Hours

(Slashed with BSCI 70184) Educates biology graduate students in central aspects of the responsible and effective conduct of research and teaching. Topics include appropriate conduct in the laboratory, effective presentations and issues related to proposal and manuscript preparation and review.

Prerequisite: Graduate standing and special approval.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter-S/U

BSCI 60191 SEMINAR IN BIOLOGY 1 Credit Hour

(Repeatable for credit) Departmental seminar required of all graduate students.

Prerequisite: Graduate standing.

Schedule Type: Seminar

Contact Hours: 1 other

Grade Mode: Satisfactory/Unsatisfactory-IP

BSCI 60198 RESEARCH 1-15 Credit Hours

(Repeatable for credit) Research or individual investigation for master's level graduate students. Credits earned may be applied toward degree requirements if department approves.

Prerequisite: Special approval and Graduate standing.

Schedule Type: Research

Contact Hours: 1-15 other

Grade Mode: Satisfactory/Unsatisfactory-IP

BSCI 60199 THESIS I 2-6 Credit Hours

Thesis students must register for a minimum of 6 hours, 2 to 6 hours in a single semester distributed over several semesters if desired.

Prerequisite: Special approval and Graduate standing.

Schedule Type: Masters Thesis

Contact Hours: 2-6 other

Grade Mode: Satisfactory/Unsatisfactory-IP

BSCI 60299 THESIS II 2 Credit Hours

Thesis students must continue registration each semester until all degree requirements are met.

Prerequisite: BSCI 60199 and Graduate standing.

Schedule Type: Masters Thesis

Contact Hours: 2 other

Grade Mode: Satisfactory/Unsatisfactory-IP

BSCI 60391 SEMINAR IN ECOLOGY 1 Credit Hour

(Repeatable for credit) (Cross-listed with BSCI 70391) Seminar on topics in animal and plant ecology. Credits earned may be applied to degree if department approves.

Prerequisite: Special approval of instructor and Graduate standing.

Schedule Type: Seminar

Contact Hours: 1 other

Grade Mode: Satisfactory/Unsatisfactory-IP

BSCI 60431 NEUROENDOCRINOLOGY 2 Credit Hours

Role of the central nervous system in the regulation of hormonal and vegetative functions and structure function relationships between brain and pituitary with modern views of neuroendocrine regulation. Methods for study of neuroendocrine relationships is discussed.

Prerequisite: Graduate standing.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 60440 CELLULAR AND MOLECULAR SIGNALING 3 Credit Hours

(Cross-listed with BSCI 70440 and BMS 60440 and BMS 70440)

The relevant and current topics associated with cellular signaling is covered. Topics include receptor pharmacology, classes and regulation, transcription factors, cell cycle signaling and cell-cell communication.

Prerequisite: BSCI 4/5/70143 and Graduate standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 60462 NEUROBIOLOGY: SYSTEMS AND BEHAVIOR 4 Credit Hours

(Slashed with BSCI 80462; Cross-listed with BMS 60462 and BMS 70462) Provides broad coverage of the parts of the central nervous systems and how they integrate sensory information, drive motor function and regulate behavior.

Prerequisite: BMS 60729 or BMS 70729 and Graduate standing.

Schedule Type: Lecture

Contact Hours: 4 lecture

Grade Mode: Standard Letter

BSCI 60491 SEMINAR IN PHYSIOLOGY 1 Credit Hour

(Repeatable for credit) (Cross-listed with BSCI 70491) Credits may be applied toward degree if department approves.

Prerequisite: Special approval of instructor and Graduate standing.

Schedule Type: Seminar

Contact Hours: 1 other

Grade Mode: Satisfactory/Unsatisfactory-IP

BSCI 70103 BIOLOGICAL STATISTICS 3 Credit Hours

(Slashed with BSCI 60103) Principles of experimental design and statistical analysis, and how to choose and interpret statistical tests using biological data sets.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70142 BIOENERGETICS 3 Credit Hours

(Cross-listed with BSCI 40142 and BSCI 50142) Lecture and discussion of respiration and photosynthesis, their origin development and control in living systems. Concepts are introduced from fundamental principles. Lecture three hours weekly.

Prerequisite: BSCI 40430 and Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70143 EUKARYOTIC CELL BIOLOGY 3 Credit Hours

(Cross-listed with BSCI 40143 and BSCI 70143) Current survey of the structure and function of eukaryotic cells, including recent advances in research technology. Lecture three hours weekly.

Prerequisite: BSCI 40430 and Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70144 SELECTED READINGS IN EUKARYOTIC CELL BIOLOGY 1 Credit Hour

(Cross-listed with BSCI 60144) Directed readings in cell and molecular biology from the primary and review literature will be presented and discussed by the students.

Prerequisite: Doctoral standing.

Corequisite: BSCI 70143.

Schedule Type: Lecture

Contact Hours: 1 lecture

Grade Mode: Standard Letter

BSCI 70146 DEVELOPMENTAL BIOLOGY 3 Credit Hours

(Cross-listed with BSCI 40146 and BSCI 50146) Fundamental concepts and paradigms of development as exemplified by major model organisms. This course will examine our modern understanding of the molecular, cellular and genetic basis of developmental biology.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70147 DEVELOPMENTAL NEUROBIOLOGY 3 Credit Hours

(Slashed with BSCI 40147 and BSCI 50147) Covers fundamental principles in developmental neurobiology, including molecular and cellular processes involved in the formation of the vertebrate central nervous system.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70148 PRINCIPLES OF INFECTIOUS DISEASE 3 Credit Hours

(Slashed with BSCI 40148 and BSCI 50148) Basic principles of infectious disease, with emphasis on major human pathogens including protozoa, bacteria, and viruses. Topics include infection establishment, spread within the host, pathology, immunity, and host behavior.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70150 MOLECULAR MECHANISMS OF DISEASE: CANCER 3 Credit Hours

(Cross-listed with BSCI 40150 and BSCI 50150) Explores the current understanding of molecular and cellular mechanisms of disease processes, including new technologies and modern strategies in the forefront of future biomedical research. Emphasis on a review of primary literature.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70151 MECHANISMS OF DISEASE: OBESITY AND RELATED METABOLIC DISEASES 3 Credit Hours

(Cross-listed with BSCI 40151 + BSCI 50171) Addresses obesity from multiple angles, including health and disease process, underlying physiology and cell and molecular biology, and the role of behavior. Emphasis on a review of primary literature to discuss obesity causes, consequences and treatments.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70152 MOLECULAR MECHANISMS OF DISEASE: NEUROLOGICAL DISORDERS 3 Credit Hours

(Slashed with BSCI 40152 and BSCI 50152) Major concepts and theoretical principles underlying neurological disorders.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70154 DIABETES AND CARDIOVASCULAR DISEASE 3 Credit Hours

(Slashed with BSCI 40154 and BSCI 50154) This course covers physiological aspects of diabetes and cardiovascular disease, including associated pathologies and therapies.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70157 NEUROBIOLOGY OF DRUG ADDICTION 3 Credit Hours

(Slashed with BSCI 40157 and BSCI 50157) Introduction to neural structures, circuitry, and chemistry underlying drug addiction, main categories of drugs of abuse, and how brain cells and circuits are modified in response to addictive drugs.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70158 MOLECULAR BIOLOGY 3 Credit Hours

(Cross-listed with BSCI 40158 and BSCI 50158) Molecular genetics, DNA and RNA structure, chromosomes, DNA replication, recombination, genetic transcription and translation, gene expression, current concepts and technologies.

Prerequisite: BSCI 30156 and Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70159 MOLECULAR BIOLOGY LABORATORY 3 Credit Hours

(Cross-listed with BSCI 40159 and BSCI 50159) Experience in research methods for studying cellular and molecular processes in plant and animal systems.

Prerequisite: Doctoral standing and special approval from instructor.

Schedule Type: Laboratory

Contact Hours: 9 lab

Grade Mode: Standard Letter

BSCI 70160 MARINE BIOLOGY 3 Credit Hours

(Cross-listed with BSCI 40160 and BSCI 50160) Natural history and ecology of marine organisms, with emphasis on life in coastal habitats. Lecture three hours weekly.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70162 SOIL BIOLOGY 3 Credit Hours

(Cross-listed with BSCI 40162 and BSCI 50162) The ecology and physiology of organisms that live in soil, including microbes, plants and animals. The physical and chemical aspects of soil are introduced to understand how organisms in soils impact nutrient cycles and ecosystem development.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70163 EVOLUTION 3 Credit Hours

(Cross-listed with BSCI 40163 and BSCI 50163) Discussion of the history of evolutionary theory, the evidence of evolution, the evolutionary forces and the products of those forces. Doctoral standing.

Prerequisite: BSCI 30156 plus 4 hours of biology.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70166 ENVIRONMENTAL SENSOR TECHNOLOGY 2 Credit Hours

(Slashed with BSCI 40166 and BSCI 50166) Provides learning experiences in the field of environmental wireless sensor technology for performing both isolated and collaborative tasks. Students will use practical tools for WST design.

Prerequisite: Doctoral standing and special approval.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 70170 STREAM BIOLOGY 3 Credit Hours

(Cross-listed with BSCI 40170 and BSCI 50170) Identification, biology and ecology of stream-inhabiting organisms. Lecture two, laboratory three hours weekly.

Prerequisite: BSCI 10181 and 10182 and Doctoral standing.

Schedule Type: Laboratory, Lecture

Contact Hours: 2 lecture, 1 lab

Grade Mode: Standard Letter

BSCI 70174 IMMUNOLOGY 3 Credit Hours

(Cross-listed with BSCI 40174 and BSCI 50174) Survey of the mammalian host responses to self and non-self with emphasis on the cellular and molecular mechanisms by which innate and acquired immunity result. Experimental design and data analyses are related to current methodologies used to study immunology. Lecture three hours weekly. Doctoral standing.

Prerequisite: BSCI 30171 and CHEM 10060, 10061 and 10062.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70184 RESPONSIBLE CONDUCT IN RESEARCH AND TEACHING-BIOLOGICAL SCIENCES 2 Credit Hours

(Slashed with BSCI 60184) Educates biology graduate students in central aspects of the responsible and effective conduct of research and teaching. Topics include appropriate conduct in the laboratory, effective presentations and issues related to proposal and manuscript preparation and review.

Prerequisite: Doctoral standing and special approval.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter-S/U

BSCI 70191 SEMINAR IN BIOLOGY 1 Credit Hour

(Repeatable for credit) Departmental seminar required of all graduate students.

Prerequisite: Doctoral standing.

Schedule Type: Seminar

Contact Hours: 1 other

Grade Mode: Satisfactory/Unsatisfactory-IP

BSCI 70193 VARIABLE TITLE WORKSHOP IN BIOLOGICAL SCIENCES 1-6 Credit Hours

(Repeatable for credit) Topics to be offered will meet specific needs in the biological sciences.

Prerequisite: Special approval and Doctoral standing.

Schedule Type: Workshop

Contact Hours: 1-6 other

Grade Mode: Satisfactory/Unsatisfactory

BSCI 70195 SPECIAL TOPICS IN BIOLOGY 1-3 Credit Hours

(Repeatable for credit) (Cross-listed with BSCI 40195 and BSCI 50195)

Prerequisite: Special approval of instructor and Doctoral standing.

Schedule Type: Laboratory, Lecture

Contact Hours: 1-3 lecture, 2-6 lab

Grade Mode: Standard Letter-IP

BSCI 70196 INDIVIDUAL INVESTIGATION 1-3 Credit Hours

(Repeatable for credit) (Cross-listed with BSCI 40196 and BSCI 50196)

Prerequisite: Special approval of instructor and doctoral standing.

Schedule Type: Individual Investigation

Contact Hours: 1-3 other

Grade Mode: Standard Letter-IP

BSCI 70221 ECOLOGICAL GENOMICS 3 Credit Hours

(Slashed with BSCI 40221 and BSCI 50221) Covers principles, concepts and techniques of ecological genomics, emphasizing the application of genomics to ecology and biogeochemistry and using genomic, metagenomic and metatranscriptomic data.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70272 PLANT ANATOMY 4 Credit Hours

(Cross-listed with BSCI 40272 and BSCI 50272) Development and structure of cells, tissues and tissue systems of seed plants. Both vegetative and reproductive structures of angiosperms will be emphasized. Lecture two hours, laboratory six hours weekly.

Prerequisite: Doctoral standing.

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 0 lab

Grade Mode: Standard Letter

BSCI 70273 INTRODUCTION TO MYCOLOGY 3 Credit Hours

(Slashed with BSCI 40273 and BSCI 50273) Introduces the key features defining the fungi. Topics include anatomical and morphological features, reproductive strategies, identification, and community interactions.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70274 PLANT COMMUNITIES OF OHIO 3 Credit Hours

(Slashed with BSCI 40274 and BSCI 50274) Designed to familiarize students with the range of plant communities within Ohio by relating plant identification to biological, hydrological, geological, and climatic forces.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70275 PLANT SYSTEMATICS AND EVOLUTION 4 Credit Hours

(Cross-listed with BSCI 40275 and BSCI 50275) Introduction to vascular plant diversity, with a focus on flowering plants. Students will learn characteristics of vascular plants and how to identify major plant groups. Lecture three hours weekly, lab two hours weekly.

Prerequisite: Doctoral standing.

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 1 lab

Grade Mode: Standard Letter

BSCI 70341 STEM CELL BIOLOGY: PRINCIPLES AND APPLICATIONS 3 Credit Hours

(Slashed with BSCI 40341 and BSCI 50341) Examination of stem cells from various tissues, molecular mechanism of stem cell differentiation, and use of stem cells in clinical applications.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70360 ICHTHYOLOGY 4 Credit Hours

(Cross-listed with BSCI 40360 and BSCI 50360) Basic biology, natural history, behavior and ecology of the fishes. Three hour lecture and three hour lab weekly.

Prerequisite: Doctoral standing.

Schedule Type: Combined Lecture and Lab

Contact Hours: 3 lecture, 3 lab

Grade Mode: Standard Letter

BSCI 70363 MICROBIAL ECOLOGY 3 Credit Hours

(Cross-listed with BSCI 40363 and BSCI 50363) Microbial interactions with their biotic and abiotic environment; control of distribution and physiological activities; emphasis on bacteria in aquatic systems. Doctoral standing.

Prerequisite: BSCI 30171, 30360.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70364 LIMNOLOGY 3 Credit Hours

(Cross-listed with BSCI 40364 and BSCI 50364) The study of the principles of aquatic ecology with emphasis on lakes and reservoirs.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70365 FIELD METHODS IN ORNITHOLOGY 3 Credit Hours

(Slashed with BSCI 40365 and BSCI 50365) Habitat-based survey of Ohio birds. Field-based lectures and activities cover location, observation and identification of birds and their songs, as well as bird ecology and behavior.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70368 WETLAND ECOLOGY AND MANAGEMENT 4 Credit Hours

(Cross-listed with BSCI 40368 and BSCI 50368) Lecture, laboratory and field study of the principles of wetland ecology including adaptations of the biota to environmental conditions, comparison among different wetland habitat types and habitat management. Lecture 3 hours, lab 3 hours weekly.

Prerequisite: Doctoral standing.

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 1 lab

Grade Mode: Standard Letter

BSCI 70370 ECOLOGICAL AND EVOLUTIONARY GENETICS 2 Credit Hours

(Cross-listed with BSCI 50370) Genetic and genomic approaches to studying ecology and evolution in populations and communities.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 70371 EVOLUTIONARY BIOLOGY 2 Credit Hours

(Cross-listed with BSCI 50371) Theoretical and experimental approaches to studying evolution from genes to populations and communities.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 70372 COMMUNITIES AND ECOSYSTEMS 2 Credit Hours

(Cross-listed with BSCI 50372) Theory and experimental approaches to studying community and ecosystem ecology.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 70373 POPULATION AND COMMUNITY ECOLOGY 2 Credit Hours

(Cross-listed with BSCI 50373) Theory and experimental approaches to studying population and community ecology.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 70374 CONSERVATION BIOLOGY 4 Credit Hours

(Cross-listed with BSCI 40374 and BSCI 50374) Provides a critical analysis of the factors that threaten biological diversity in the biosphere and the consequences on biological processes and quality of life.

Prerequisite: BSCI 30360 and Doctoral standing.

Schedule Type: Lecture

Contact Hours: 4 lecture

Grade Mode: Standard Letter

BSCI 70375 ENVIRONMENTAL BIOLOGY AND MANAGEMENT 4 Credit Hours

(Cross-listed with BSCI 40375 and BSCI 50375) Introduction to current concepts in applied ecology and ecosystem management. Students will learn aspects of ecosystem management and restoration including: 1) how environmental factors affect organism survival and ecosystem structure, 2) how human impacts such as pollution, habitat fragmentation, introduction of invasive species affect ecosystems, and 3) the use of ecological principles and methods to restore and manage ecosystems.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 4 lecture

Grade Mode: Standard Letter

BSCI 70376 TROPICAL FIELD BIOLOGY AND CONSERVATION 5 Credit Hours

(Cross-listed with BSCI 40376 and BSCI 50376) Introduction to major issues in tropical ecology and conservation including the threats to the biological diversity of tropical ecosystems resulting from human activities. Students learn how to apply modern field-observation techniques to generate and test problem-solving hypotheses.

Prerequisite: Doctoral standing.

Schedule Type: Combined Lecture and Lab

Contact Hours: 3 lecture, 6 lab

Grade Mode: Standard Letter

BSCI 70391 SEMINAR IN ECOLOGY 1 Credit Hour

(Repeatable for credit) (Cross-listed with BSCI 60391) Seminar on topics in animal and plant ecology. Credits earned may be applied to degree if department approves.

Prerequisite: Special approval of instructor and Doctoral standing.

Schedule Type: Seminar

Contact Hours: 1 other

Grade Mode: Satisfactory/Unsatisfactory-IP

BSCI 70431 NEUROENDOCRINOLOGY 2 Credit Hours

Role of the central nervous system in the regulation of hormonal and vegetative functions; structure function relationships between brain and pituitary with modern views of neuroendocrine regulation. Methods for study of neuroendocrine relationships is discussed.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 70432 ENDOCRINOLOGY 3 Credit Hours

(Cross-listed with BSCI 40432 and BSCI 40432) Principles of endocrine regulation of physiological and metabolic processes. Morphological and functional interrelationships between systems. Lecture three hours weekly.

Prerequisite: BSCI 40430 and Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70433 MAMMALIAN PHYSIOLOGY I 3 Credit Hours

Physiology of the endocrine, nervous, and reproductive systems.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70434 MAMMALIAN PHYSIOLOGY II 3 Credit Hours

Physiology of cardiovascular, renal, respiratory and digestive systems. Lecture three hours.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70440 CELLULAR AND MOLECULAR SIGNALING 3 Credit Hours

(Cross-listed with BSCI 60440 and BMS 60440 and BMS 70440)

The relevant and current topics associated with cellular signaling is covered. Topics include receptor pharmacology, classes and regulation, transcription factors, cell cycle signaling and cell-cell communication.

Prerequisite: BSCI 4/5/70143 and Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70450 BIOLOGICAL CLOCKS 2 Credit Hours

(Cross-listed with BSCI 40450 and BSCI 50450) Topics covered include the characteristics of biological clocks, their ecology, molecular biology, and neurobiology, the function and organization of sleep, and the medical implications of biological rhythmicity. Students enrolling at the graduate level should have some background in neurobiology and genetics.

Prerequisite: Doctoral standing.

Corequisite: BSCI 70451.

Schedule Type: Lecture

Contact Hours: 2 lecture

Grade Mode: Standard Letter

BSCI 70451 CURRENT TOPICS IN BIOLOGICAL CLOCKS RESEARCH 1 Credit Hour

(Cross-listed with BSCI 50451) Discussion of current research literature in the area of research on biological clocks.

Prerequisite: Doctoral standing.

Corequisite: BSCI 70450.

Schedule Type: Seminar

Contact Hours: 1 lecture

Grade Mode: Standard Letter-S/U

BSCI 70460 ADVANCED HUMAN PHYSIOLOGY 3 Credit Hours
(Slashed with BSCI 40460 and BSCI 50460) Major concepts and theoretical principles of human physiology, including nervous, endocrine, cardiovascular, respiratory, renal, gastrointestinal and reproductive systems.

Prerequisite: Doctoral standing.

Corequisite: BSCI 70462.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70462 ADVANCED HUMAN PHYSIOLOGY: READINGS AND CASE STUDIES 1 Credit Hour

(Slashed with BSCI 40462 and BSCI 50462) Designed to complement the lecture course in Advanced Human Physiology. Students will read primary literature in physiology and work independently and in groups to apply their knowledge to solving case studies.

Prerequisite: Doctoral standing.

Corequisite: BSCI 70460.

Schedule Type: Lecture

Contact Hours: 1 lecture

Grade Mode: Standard Letter

BSCI 70463 MEDICAL BIOTECHNOLOGY 3 Credit Hours

(Slashed with BSCI 40463 and BSCI 50463) (Cross-listed with BTEC 40463) Medical Biotechnology provides a basic understanding of how living cells and cellular materials can be used for medical applications, particularly in the diagnosis and therapy of human diseases.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70491 SEMINAR IN PHYSIOLOGY 1 Credit Hour

(Repeatable for credit) (Cross-listed with BSCI 60491) Credits may be applied toward degree if department approves.

Prerequisite: Special approval of instructor and Doctoral standing.

Schedule Type: Seminar

Contact Hours: 1 other

Grade Mode: Satisfactory/Unsatisfactory-IP

BSCI 70515 ANIMAL BEHAVIOR 3 Credit Hours

Explores the evolution of various animal behaviors, the functions they might serve, and the interplay among the social, ecological and physiological mechanisms that regulate their occurrence.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70517 MEDICAL HISTOLOGY 3 Credit Hours

(Cross-listed with BSCI 40517 and BSCI 50517) Study of the microscopic and submicroscopic structure of the mammalian body in relation to function. Lecture two hours laboratory three hours weekly.

Prerequisite: 4 hours of biology and Doctoral standing.

Schedule Type: Laboratory, Lecture

Contact Hours: 2 lecture, 3 lab

Grade Mode: Standard Letter

BSCI 70519 HORMONES AND BEHAVIOR 3 Credit Hours

(Cross-listed with BSCI 40519 and BSCI 70519) Current concepts of hormone and behavior interactions across species.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70520 BEHAVIORAL EVOLUTION 3 Credit Hours

(Cross-listed with BSCI 40520 and BSCI 50520) Examination of how behavior contributes to survival and reproduction in an ecological context. We consider how behavior may have evolved in a wide range of animals. Students enrolled at the graduate level will be expected to have had a course in evolution.

Prerequisite: Doctoral standing and special approval.

Corequisite: BSCI 70522.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70522 READINGS IN BEHAVIORAL EVOLUTION 1 Credit Hour

(Cross-listed with BSCI 50522) Graduate reading course designed to give experience leading discussions and writing proposals. Students enrolled at the graduate level will be expected to have had a course in evolution.

Prerequisite: Doctoral standing and special approval.

Corequisite: BSCI 70520.

Schedule Type: Seminar

Contact Hours: 1 other

Grade Mode: Standard Letter-S/U

BSCI 70525 WILDLIFE RESOURCES 3 Credit Hours

(Cross-listed with BSCI 40525 and BSCI 50525) Ecological parameters are discussed relative to the preservation and management of wild animal populations. Aesthetic economic and environmental values are discussed. Lecture three hours weekly.

Prerequisite: 4 hours of biology and Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 70556 VERTEBRATE ZOOLOGY 4 Credit Hours

(Cross-listed with BSCI 40556 and BSCI 50556) Field approach to identification and natural history of all Ohio vertebrates except birds. Lecture three hours laboratory and field three hours weekly.

Prerequisite: plus 4 hours of biology and Doctoral standing.

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 3 lab

Grade Mode: Standard Letter

BSCI 71120 BIOLOGICAL LIGHT MICROSCOPY 3 Credit Hours

(Slashed with BSCI 41120 and BSCI 51120) Theoretical and practical information on the operation of optical microscopes, the application of transmission and fluorescence microscopy to biological specimens, and analysis of microscopic images.

Prerequisite: Doctoral standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 80145 MEDICAL GENOMICS 3 Credit Hours

(Cross-listed with BSCI 60145) Explores the relationship and contribution of genetics and genomics to healthcare issues, including disease susceptibility and therapeutic efficacy. Up-to-date genomics concepts and their applications to health care and the challenges of personalized medicine including genetic analyses (e.g., linkage and estimating population risks), ethical issues in genetic testing and therapy, genetic basis of disease processes (e.g., neurological, cardiovascular and neoplastic diseases) and epigenetic processes (that may link the environment to the risk of chronic diseases) are covered. This course requires an understanding of genetics and physiology; students should contact the Department of Biological Sciences to determine if they have the requisite prior training.

Prerequisite: Doctoral standing and special approval.

Schedule Type: Lecture

Contact Hours: 3 lecture

Grade Mode: Standard Letter

BSCI 80198 RESEARCH 1-15 Credit Hours

(Repeatable for credit) Research or individual investigation for doctoral students who have not yet passed candidacy examination.

Prerequisite: Doctoral standing.

Schedule Type: Research

Contact Hours: 1-15 other

Grade Mode: Satisfactory/Unsatisfactory-IP

BSCI 80199 DISSERTATION I 15 Credit Hours

(Repeatable for credit) Doctoral dissertation, for which registration in at least two semesters is required first of which will be semester in which dissertation work is begun and continuing until the completion of 30 hours.

Prerequisite: Special approval and Doctoral standing.

Schedule Type: Dissertation

Contact Hours: 15 other

Grade Mode: Satisfactory/Unsatisfactory-IP

BSCI 80299 DISSERTATION II 15 Credit Hours

(Repeatable for credit) Continuing registration of doctoral students who have completed the initial 30 hours of dissertation and continuing until all degree requirements are met.

Prerequisite: BSCI 80199 and Doctoral standing.

Schedule Type: Dissertation

Contact Hours: 15 other

Grade Mode: Satisfactory/Unsatisfactory-IP

BSCI 80462 NEUROBIOLOGY: SYSTEMS AND BEHAVIOR 4 Credit Hours

(Slashed with BSCI 60462; Cross-listed with BMS 60462 and BMS 70462) Provides broad coverage of the parts of the central nervous systems and how they integrate sensory information, drive motor function and regulate behavior.

Prerequisite: BMS 60729 or BMS 70729 and Doctoral standing.

Schedule Type: Lecture

Contact Hours: 4 lecture

Grade Mode: Standard Letter

Clinical Laboratory Sciences (CLS)**CLS 49010 CLINICAL MICROBIOLOGY: THEORY 4 Credit Hours**

Theoretical consideration of laboratory isolation, cultivation, identification and characterization of pathogenic microorganisms.

Prerequisite: Medical technology (MEDT) major.

Schedule Type: Clinic

Contact Hours: 8 other

Grade Mode: Standard Letter-IP

CLS 49011 CLINICAL MICROBIOLOGY: APPLICATIONS 4 Credit Hours

Applied and practical considerations of theoretical aspects of laboratory isolation, cultivation, identification and characterization of pathogenic microorganisms. Letter grades and ip.

Prerequisite: Medical technology (MEDT) major.

Schedule Type: Clinic

Contact Hours: 8 other

Grade Mode: Standard Letter-IP

CLS 49012 CLINICAL IMMUNOLOGY: THEORY 1 Credit Hour

Theoretical considerations of laboratory practices involving quantitation and detection of antigens and antibodies and the significance of these findings in pathological states.

Prerequisite: Medical technology (MEDT) major.

Schedule Type: Clinic

Contact Hours: 2 other

Grade Mode: Standard Letter-IP

CLS 49013 CLINICAL IMMUNOLOGY: APPLICATIONS 1 Credit Hour

Applied and practical consideration of laboratory practices in immunology and serology relating to diagnosis of disease states.

Prerequisite: Medical technology (MEDT) major.

Schedule Type: Clinic

Contact Hours: 2 other

Grade Mode: Standard Letter-IP

CLS 49014 CLINICAL MYCOLOGY: THEORY AND APPLICATIONS 1 Credit Hour

Theoretical, applied and practical consideration of the isolation, identification and characterization of pathogenic fungi and their relation to human disease states.

Prerequisite: Medical technology (MEDT) major.

Schedule Type: Clinic

Contact Hours: 2 other

Grade Mode: Standard Letter-IP

CLS 49015 CLINICAL PARASITOLOGY: THEORY AND APPLICATIONS 1 Credit Hour

Theoretical, applied and practical considerations of the isolation, identification and characterization of human parasites and their relations to pathologic conditions.

Prerequisite: Medical technology (MEDT) major.

Schedule Type: Clinic

Contact Hours: 2 other

Grade Mode: Standard Letter-IP

CLS 49020 CLINICAL CHEMISTRY: THEORY 4 Credit Hours

Theoretical considerations of the principles of clinical chemistry relating to the identification and quantitation of biologically important substances in blood and other body fluids.

Prerequisite: Medical technology (MEDT) major.

Schedule Type: Clinic

Contact Hours: 8 other

Grade Mode: Standard Letter-IP

CLS 49021 CLINICAL CHEMISTRY: APPLICATIONS 3 Credit Hours

Applied and practical considerations of clinical chemistry principles relating to significant changes in body fluids as the result of pathologic conditions.

Prerequisite: Medical technology (MEDT) major.

Schedule Type: Clinic

Contact Hours: 6 other

Grade Mode: Standard Letter-IP

CLS 49022 URINALYSIS: THEORY 1 Credit Hour

Theoretical considerations of the physiological activities of the renal system together with laboratory principles of analysis of urine and other body fluids.

Prerequisite: Medical technology (MEDT) major.

Schedule Type: Clinic

Contact Hours: 2 other

Grade Mode: Standard Letter-IP

CLS 49023 URINALYSIS: APPLICATIONS 1 Credit Hour

Applied and practical considerations of laboratory practices in urine and other body fluid analysis as aids in diagnosis of disease.

Prerequisite: Medical technology (MEDT) major.

Schedule Type: Clinic

Contact Hours: 2 other

Grade Mode: Standard Letter-IP

CLS 49030 IMMUNOHEMATOLOGY: THEORY 2 Credit Hours

Theoretical consideration of laboratory procedures involved in blood grouping and typing; identification of blood group antigens and antibodies collection and preparation of blood for transfusion.

Prerequisite: Medical technology (MEDT) major.

Schedule Type: Clinic

Contact Hours: 4 other

Grade Mode: Standard Letter-IP

CLS 49031 IMMUNOHEMATOLOGY: APPLICATIONS 2 Credit Hours

Applied and practical consideration of laboratory methods for the administration of blood and its components.

Prerequisite: Medical technology (MEDT) major.

Schedule Type: Clinic

Contact Hours: 4 other

Grade Mode: Standard Letter-IP

CLS 49032 COAGULATION: THEORY AND APPLICATIONS 1 Credit Hour

Theoretical consideration of the coagulation mechanism and its relation to pathological states; identification of abnormalities and deficiencies.

Prerequisite: Medical technology (MEDT) major.

Schedule Type: Clinic

Contact Hours: 2 other

Grade Mode: Standard Letter-IP

CLS 49033 CLINICAL HEMATOLOGY: THEORY 2 Credit Hours

Theoretical considerations of the development of formed elements; identification of marrow and blood cells; study of normal and abnormal cellular blood components.

Prerequisite: Medical technology (MEDT) major.

Schedule Type: Clinic

Contact Hours: 4 other

Grade Mode: Standard Letter-IP

CLS 49034 CLINICAL HEMATOLOGY: APPLICATIONS 2 Credit Hours

Applied and practical consideration of laboratory methods and procedures in identification and enumeration of normal and abnormal formed elements of blood.

Prerequisite: Medical technology (MEDT) major.

Schedule Type: Clinic

Contact Hours: 4 other

Grade Mode: Standard Letter-IP

CLS 49040 TOPICS IN LABORATORY MANAGEMENT 1 Credit Hour

Consideration of topics relating to safety, education, personnel, budgeting, scheduling and medical legal problems. Repeatable for a total of 4 hours.

Prerequisite: Medical technology (MEDT) major.

Schedule Type: Clinic

Contact Hours: 2 other

Grade Mode: Standard Letter-IP

CLS 49095 SPECIAL TOPICS IN MEDICAL TECHNOLOGY 1-4 Credit Hours

(Repeatable for a maximum of 4 credit hours) Topical consideration of special techniques encountered in nuclear medicine, cytology, cytogenetics, virology, toxicology and special instrumentation.

Prerequisite: Medical technology (MEDT) major.

Schedule Type: Clinic

Contact Hours: 2-8 other

Grade Mode: Standard Letter-IP