The course will emphasize theories of its normal functioning and its responses to the instructor. Covering the organization and function of the human nervous system, including histology, physiology, bone development, biomechanics, identification and interpretation of skeletal structures, and a study of pathology and trauma.

**BIOH 305. Human Skeletal Biology. 3 Credits.**
Offered by Gallatin College. Human anatomy, physiology, and pathology; of skeletal, muscular, nervous, and endocrine systems. Cadaver laboratory will cover related human anatomy.

**BIOH 201. Human Anatomy and Physiology I. 5 Credits.**
(3 Lec) F,S;Su
PREREQUISITE: CHMY 121N or CHMY 141 or CHMY 151 with grades of "C-" or better. Function of the human body. For students planning to be health professionals. Includes basic cellular mechanisms, physiological control and communications. Major topics include muscle, nerve, respiratory, renal and cardiovascular systems. Cadaver laboratory will cover related human anatomy.

**BIOH 287. Intermediate Human Phys I. 3 Credits.**
(3 Lec) F,S
PREREQUISITE: BIOH 201 with grades of "C-"; priority given to majors requiring this course. General principles of cell and tissue biology that apply to all living systems. Structure and function of skeletal, muscular, nervous, and endocrine systems. Homeostasis, control, and integration of the human body will be emphasized. Laboratory will cover related systems. This course is not repeatable without prior consent of instructor.

**BIOH 288. Intermediate Human Phys II. 3 Credits.**
(3 Lec, 1 Lab) S,F
PREREQUISITE: BIOH 201 with grades of "C-"; priority given to majors requiring this course. Structure and function of digestive, cardiovascular, respiratory, reproductive, and urinary systems of humans. Principles of integration, metabolism, energy flow, and homeostasis will be emphasized. This course is not repeatable without prior consent of instructor.

**BIOH 320. Biomedical Genetics. 3 Credits.**
PREREQUISITE: BIOH 201. Introduction to fundamental principles of eukaryotic molecular genetics. Emphasis on the genetics of the major model organisms of biomedical research and how they are exploited to understand human biology and disease.

**BIOH 323. Human Developmental Biology. 4 Credits.**
PREREQUISITE: BIOH 201. Introduction to cell signaling and morphogenetic processes that establish the basic vertebrate body plan. Regulation of gene expression in the context of embryonic development. Includes hands-on study of chicken and frog embryos.

**BIOH 395. Human Pathophysiology. 3 Credits.**
PREREQUISITE: Cell Biology and Neuroscience major and BCH 380 or BCH 441. Students will research two diseases of their own choosing and give a class presentation of their findings. The presentation normally includes diagnosis, pathophysiology, and treatment.

**BIOH 405. Hematology. 3 Credits.**
PREREQUISITE: BIOH 410 or BCH 380 are recommended. A study of the blood and bone marrow with emphasis on the role blood cells play in the major systems, including etiology, prognosis, medical treatment, signs and symptoms of diseases of respiratory, endocrine, excretory, and reproductive systems. Proper diet and nutrition guidelines are also addressed. This course requires strong analytical skills.

**BCH 441. Students will research two diseases of their own choosing and give a class presentation of their findings.**

**BIOH 323. Human Developmental Biology. 4 Credits.**
PREREQUISITE: BIOH 313 Introduction to the study of neuroethology based on an in-depth view of the molecular aspects of neuroscience. Student projects will then use that knowledge to research the current state of molecular understanding of a chosen neurological disease.

**BIOH 428. Intermediate Human Phys II. 3 Credits.**
PREREQUISITE: BIOH 201 with grades of "C-" or better. Function of the human body. Includes basic cellular mechanisms, physiological control and communications. Major topics include muscle, nerve, respiratory, renal and cardiovascular systems. Cadaver laboratory will cover related human anatomy.

**BIOH 320. Biomedical Genetics. 3 Credits.**
PREREQUISITE: BIOH 201. Introduction to fundamental principles of eukaryotic molecular genetics. Emphasis on the genetics of the major model organisms of biomedical research and how they are exploited to understand human biology and disease.

**BIOH 323. Human Developmental Biology. 4 Credits.**
PREREQUISITE: BIOH 201. Introduction to cell signaling and morphogenetic processes that establish the basic vertebrate body plan. Regulation of gene expression in the context of embryonic development. Includes hands-on study of chicken and frog embryos.

**BIOH 395. Human Pathophysiology. 3 Credits.**
PREREQUISITE: Cell Biology and Neuroscience major and BCH 380 or BCH 441. Students will research two diseases of their own choosing and give a class presentation of their findings. The presentation normally includes diagnosis, pathophysiology, and treatment.

**BIOH 405. Hematology. 3 Credits.**
PREREQUISITE: BIOH 410 or BCH 380 are recommended. A study of the blood and bone marrow with emphasis on the role blood cells play in the major systems, including etiology, prognosis, medical treatment, signs and symptoms of diseases of respiratory, endocrine, excretory, and reproductive systems. Proper diet and nutrition guidelines are also addressed. This course requires strong analytical skills.

**BCH 441. Students will research two diseases of their own choosing and give a class presentation of their findings.**

**BIOH 323. Human Developmental Biology. 4 Credits.**
PREREQUISITE: BIOH 313 Introduction to the study of neuroethology based on an in-depth view of the molecular aspects of neuroscience. Student projects will then use that knowledge to research the current state of molecular understanding of a chosen neurological disease.
BIOH 435. Cognitive Neuroscience. 3 Credits. (3 Lec) F
PREREQUISITE: BIOH 313. This course will survey our present knowledge of the neural basis of normal and abnormal cognitive function in humans and non-human primates. Topics will range from perception and action to attention, consciousness and mental illness.

BIOH 440. Neuroscience of Mental Illness. 3 Credits. (3 Lec) S
PREREQUISITE: BIOH 313. Survey of the major categories of human mental illness and their underlying neural mechanisms and treatments.

BIOH 444. Modeling Brain Disorders. 3 Credits. (3 Lec) F
PREREQUISITE: BIOH 313. In this course, students will delve into the primary research literature in the field of behavioral neuroscience. We will study a variety of model systems and paradigms used to study neurological and psychiatric disorders. In addition, students will learn to effectively communicate about science orally and in writing.

BIOH 445. Intro Pharmacology. 3 Credits. (3 Lec)
PREREQUISITE: BIOH 185 or BIOH 201 and BIOH 260. An introduction to the pharmacodynamics of drug action. Major classes of pharmaceutical drugs will be studied to understand their mechanism of action at the cellular and organ levels. Clinical trials for new drugs will also be considered.

BIOH 454. Microanatomy (Histology). 3 Credits. (2 Lec, 1 Lab) F
PREREQUISITE: BIOH 260, or consent of instructor. Covers an introductory microscopic study of mammalian cells, tissues and organs. Emphasizing normal structure and function relating to disease processes in specific organ systems. Class discussion will relate the normal microanatomy to human pathophysiology.

BIOH 455. Molecular Medicine. 3 Credits. (3 Lec) F
PREREQUISITE: BIOH 313 and BIOH 320 and BCH 380. Lecture and seminar courses based on recent, original papers. Moves from human disease to molecular explanations. Intended for upper level students with a strong background in biology.

BIOH 464. Clinical Hematology and Body Fluids. 2 Credits. (1 Lec, 1 Lab) Su
PREREQUISITE: Acceptance in professional training program. Topics include a review of normal hematopoiesis; red blood cell, white blood cell, and platelet disorders; body fluid overview; and an introduction to hematologic instrumentation.

BIOH 465R. Gene Expression Lab: From Genes to Proteins to Cells. 3 Credits. (3 Lab) On Demand
PREREQUISITE: BCH 380 or BCH 441. This course will give students the opportunity to design a unique research project, then learn and use the appropriate methods to pursue their research question. The course will expose students to the research process used in most basic science labs.

BIOH 466. Clin Microbiology I. 3 Credits. (2 Lec, 1 Lab) Su
PREREQUISITE: Acceptance in professional training program. Topics include a review of medical microbiology, virology, mycology, parasitology, and clinical laboratory testing procedures.

BIOH 467. Clinical Chemistry I. 3 Credits. (2 Lec, 1 Lab) Su
PREREQUISITE: Acceptance in professional training program. Topics include an introduction to theories and principles with emphasis on all body systems, and the role of instrumentation in the clinical chemistry laboratory.

BIOH 468. Clinical Immunohematology I. 3 Credits. (2 Lec, 1 Lab) Su
PREREQUISITE: Acceptance in professional training program. Basic techniques in blood banking. Topics to be included are: ABO/Rh typing, antibody identification, transfusion therapy and reactions, donor collection and component preparation.

BIOH 469. Essentials of Clinical Lab Practice. 1 Credit. (1 Lab) Su
PREREQUISITE: Acceptance in professional training program. Provides an orientation to the program, safety information, phlebotomy training, and an overview of management practices. Also includes instruction in hemostasis, molecular diagnostics and urinalysis.

BIOH 470. Summer Clinical Laboratory. 12-13 Credits. Su
PREREQUISITE: To take this course, students must be accepted into a professional training program. This is a clinical laboratory science course, which will be conducted at affiliate training programs during the summer of a student's senior year. It includes student lecture and laboratory instruction in clinical immunohematology, clinical chemistry, phlebotomy, clinical hemostasis, clinical microscopy and urinalysis, clinical body fluids, transfusion techniques, and clinical microbiology.

BIOH 471. Professional Training I. 12-13 Credits. (12-13 Lec; 13 cr max) F
PREREQUISITE: To take this course, students must be accepted into a professional training program. BIOH 470. Students will review basic and advanced information in immunohematology, clinical chemistry, clinical hematology, clinical microbiology, clinical immunology, medical mycology, and phlebotomy techniques. Students will perform patient laboratory testing under the guidance of trained professionals.

BIOH 472. Professional Training II. 12-13 Credits. (12-13 Lec; 13 cr max) S
PREREQUISITE: To take this course, students must be accepted into a professional training program. BIOH 471. Students will learn financial and quality management information of the clinical laboratory and study advanced immunohematology, clinical chemistry, clinical microbiology, and clinical hematology. During this course, students will perform actual patient laboratory testing under the guidance of trained professionals.

BIOH 473. Laboratory Practice II. 1 Credit. (1 Lab) F
PREREQUISITE: Students must be accepted to the MMLS training program. Essential skills for performing phlebotomy, laboratory specimen collection, handling and preparing samples for laboratory analysis and interpersonal communication skills will be emphasized.

BIOH 474. Clinical Hematology II. 2 Credits. (2 Lab) F
PREREQUISITE: Students must be accepted to the MMLS training program. Blood cell identification, manual and automated procedures for the assessment of hematologic disease will be emphasized. Students will begin to learn to assess, interpret and correlate hematologic data with disease.

BIOH 475. Clinical Hemostasis. 1 Credit. (1 Lab) F
PREREQUISITE: Students must be accepted to the MMLS training program. Laboratory skills using manual and automated procedures will be emphasized. Students will assess, interpret and correlate data as it relates to normal and abnormal hemostasis and anticoagulant therapy.

BIOH 476. Clinical Microbiology II. 3 Credits. (3 Lab) F
PREREQUISITE: Students must be accepted to the MMLS training program. The ability to differentiate pathogens from commensals and perform identification procedures and antimicrobial susceptibility testing are emphasized along with an introduction to specialized and automated testing.

BIOH 477. Clinical Chemistry and Urinalysis II. 3 Credits. (3 Lab) F
PREREQUISITE: Students must be accepted to the MMLS training program. Manual and automated procedures for determining chemical analytes in blood and body fluids and the associated disease conditions will be emphasized along with an introduction to specialized testing.

BIOH 478. Clinic Immunohematology II. 2 Credits. (2 Lab) F
PREREQUISITE: Students must be accepted to the MMLS training program. Maintenance of blood components and performing routine and basic problem solving procedures in the blood bank will be emphasized. Correlation of immunohematology theory and disease with testing and transfusion practices and patient care will be covered.

BIOH 479. Clinical Immunology/Serology. 1 Credit. (1 Lab) F
PREREQUISITE: Students must be accepted to the MMLS training program. Assessment, interpretation and clinical significance of immunology principles and techniques and their correlation to laboratory data and patient disease will be emphasized.

BIOH 482. Laboratory Practice III. 2 Credits. (2 Lab) S
PREREQUISITE: Students must be accepted to the MMLS training program. A two week rotation in a small hospital laboratory provides an opportunity to experience a different work environment and practice laboratory skills.

BIOH 484. Clinical Hematology III. 2 Credits. (2 Lab) S
PREREQUISITE: Students must be accepted to the MMLS training program. Competence in performing testing and the ability to assess, interpret, and correlate hematologic data with other patient information to recommended additional testing, diagnosis, and probable treatment option for the patient will be emphasized.

BIOH 486. Clinical Microbiology III and Molecular Diagnostics. 2 Credits. (2 Lab) S
PREREQUISITE: Students must be accepted to the MMLS training program. Competently identify and provide susceptibility data for microorganisms isolated from human specimens including clinically significant yeasts, molds, parasites, viruses and mycobacterium. Perform molecular diagnostic techniques available.

BIOH 487. Clinical Chemistry III. 2 Credits. (2 Lab) S
PREREQUISITE: Students must be accepted to the MMLS training program. Achieve entry level knowledge of disease processes, and exhibit professional competencies in clinical chemistry laboratory procedures and the operation of laboratory instrumentation.
BIOH 488. Clinical Immunohematology. 3 Credits. (3 Lab) S
PREREQUISITE: Students must be accepted to the MMLS training program. Maintain competency and the ability to correlate testing data to theory and initiate advanced techniques where appropriate. Students will demonstrate entrance level competency by managing the daily aspects of blood bank operation.

BIOH 489. Laboratory Management. 1 Credit. (1 Lab) S
PREREQUISITE: Students must be accepted to the MMLS training program. General management policies, principles, and procedures necessary for efficient operation of a clinical laboratory will be emphasized along with federal and state regulations which govern the clinical laboratory.

BIOH 490R. Undergraduate Research. 1-6 Credits. (1-6 Ind; 12 cr max) F,S,Su
PREREQUISITE: Consent of instructor. Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis. Course will address responsible conduct of research. May be repeated.

BIOH 491. Special Topics. 1-4 Credits. (1-4 Lec; 12 cr max) On Demand
PREREQUISITE: BIOB 260. Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand.

BIOH 492. Independent Study. 1-3 Credits. (1-3 Ind; 6 cr max) On Demand
PREREQUISITE: Junior standing, consent of instructor and approval of department head. Directed research and study on an individual basis.

BIOH 509. Advanced Human Torso Anatomy. 4 Credits. (2 Lec, 2 Lab) F
PREREQUISITE: Degree-seeking graduate student, undergraduate A & P coursework. Covers thoracic, abdominal and pelvic anatomy, emphasizing anatomical landmarks and relationships. Instruction will be based on student dissections of human cadavers, and lectures covering structure, function, and common pathology. Co-Convener with BIOL 409.

BIOH 510. Topics in Neurobiology. 3 Credits. (2 Lec. 1 Lab) S
PREREQUISITE: Graduate standing and at least one upper division or graduate course in neurobiology. Recent advances in topics in neurobiology with emphasis in different years on either neurocystology, neuroendocrinology, immunogenetics, or developmental neurobiology.

BIOH 511. Advanced Human Anatomy. 4 Credits. (2 Lec. 2 Lab) S
PREREQUISITES: Degree-seeking graduate student, undergraduate anatomy and physiology work. Covers the musculoskeletal system of the back and upper and lower extremity and arthrology, emphasizing anatomical landmarks and relationships. Integrating of vascular and nervous supply along with the understanding of kinesiology will also be a major focus. Instruction will be based on student dissections of human cadavers, and lectures covering structure, function, and common pathology. Cross-Listed with BIOH 411.

BIOH 520. Molecular Genetics. 3 Credits. (3 Lec) S
PREREQUISITE: BIOH 320. This course will focus on the use of current molecular genetic methods in biomedical research for editing and functionally analyzing eukaryotic genomes.

BIOH 528. Molecular Basis of Neurological Diseases. 3 Credits. (1 Lec, 1 Ind, 1 Ret) F
PREREQUISITE: BIOH 313 and BIOH 525 or consent of instructor. This course will give an in-depth view of the molecular aspects to neuroscience. Student projects will then use that knowledge to do their own research into the current molecular understanding of a chosen neurological disease and writing up an NIH research proposal.

BIOH 542. Survey of Current Cell Signaling. 2 Credits. (2 Sem.; max 12) S
This course will be in a journal club style where peer reviewed articles will be presented and discussed in a critical fashion. The goals are to learn how to synthesize information, develop critical thinking, keep up with the literature, learn about new topics and foster interdisciplinary interactions. Topics will be student driven with the restriction that they fall under the broad umbrella of cell signaling.

BIOH 565. Gene Expression Lab: From Genes to Proteins to Cells. 3 Credits. (3 Lab) S
PREREQUISITES: BIOH 425 and BCH 380. This course is intended to develop a specific research question and to learn the appropriate techniques necessary to address the chosen research question. The primary focus will be experience with a wide breadth of laboratory techniques including tissue culture, heterologous expression, microscopy, RNA extraction, RT-PCR, gene expression analysis, protein extraction, protein expression analysis, and data quantification.

BIOH 586. A Big Ideas Approach for AP Biology Teachers. 3 Credits. (2 Lec, 1 Rec) Su
PREREQUISITE: A minimum of 2 years teaching experience teaching high school biology with emphasis on AP biology. This course is designed to introduce teachers of Advanced Placement (AP) Biology to a Big Ideas approach: evolution, energy, information and system. A Big Idea approach focuses on key concepts and related content that define the AP Biology course and exam. Big ideas encompass the core scientific principles, theories and processes governing living organisms and biological systems. Students in the course will finish by developing a lesson plan using this pedagogy that could be used for a high school AP Biology course.

BIOH 590. Master's Thesis. 1-10 Credits. (1-10 Ind; max unlimited) F,S,Su
PREREQUISITE: Master's standing.

BIOH 592. Independent Study. 1-3 Credits. (1-3 Ind; 6 cr max) On Demand
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Studies. Directed research and study on an individual basis.

BIOH 594. Seminar. 1 Credit. (1 Sem; 4 cr max) On Demand
PREREQUISITE: Graduate standing or seniors by petition and course prerequisites as determined for each offering. Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

BIOH 595. Anatomy & Physiology for Tchrs. 3 Credits. (1 Lec. 1 Lab. 1 Rec) Su
PREREQUISITES: Teacher of science with a minimum of two years teaching experience. Must have solid background in life science. This course is designed for high-school and post-secondary instructors who are either currently teaching an anatomy and physiology course or are interested in developing one. The goal of the course is to help instructors develop an A&P curriculum that integrates Next Generation Science Standards. Participants from all A&P instructional backgrounds are welcome and should expect to work in a collaborative environment.

BIOH 690. Doctoral Thesis. 1-10 Credits. (1-10 Ind; max unlimited) F,S,Su
PREREQUISITE: Doctoral standing.
Font Notice

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

Times was used instead of Adobe Garamond Pro.

The editor may contact Leepfrog for a draft with the correct fonts in place.