
ART (AR)

(Department of Communication and Fine Arts)

Associate Professor Peter J. Bicak, Ph.D. (Chair)

Associate Professor Will Valk, M.F.A.

The philosophy of the art program rests on the belief that art is not an ornament to education but an essential way of grounding knowledge in experience. The arts present the human rather than the theoretical implications of knowledge. In a complex and rapidly changing society the study of art introduces the student to a universal human activity and to a visual language which infuses forms with meaning and affirms our common membership in one human family. In art history and in studio Rockhurst offers courses which can provide a firm foundation for productive future study.

Minor Field of Concentration

The lower-division prerequisites for the minor in art are one of the following: AR 1110, AR 1120, or AR 1130; and three of the following: AR 1200, AR 1250, AR 1300, AR 1350, or AR 1400. The upper-division course requirements are three of the following: AR 3200, AR 3250, AR 3300, AR 3350, or AR 3400. An additional upper-division course or independent study in painting, sculpture, ceramics, or photography completes the requirements. A grade of C or better is required in each upper-division course in the minor. (A grade of C- will not fulfill the requirement.)

AR 1110, AR 1120. Introduction to Art History I, II (3)*Fall and Spring semesters*

These courses provide a survey of the role of art in the western tradition and of the changing meanings which art has had at different periods and for different cultures within this tradition. The courses concentrate on several periods which have been of pivotal importance in shaping this tradition and examine the relationship which art has to the cultures which produced it and to ourselves today. AR 1110 follows the course of art from prehistory through the early Renaissance; AR 1120 concentrates on the period from the High Renaissance to the present. Each course has been designed as a complete unit and either or both courses may be taken in any order. (ARI)

AR 1130. Introduction to Non-Western Art (3)

This course explores the arts of Africa, Oceania, and Native America. The formal and expressive language of the arts can transcend cultural barriers and create a dialogue not only with individuals within one's own culture, but also with individuals and cultures separated from us by time and space. This language is a way of enlarging our understanding of the human condition. AR 1130 aims to expand the student's worldview by introducing and exploring the visual and performance arts from the earliest archaeological finds to contemporary creations from Sub-Saharan Africa, Oceania (Polynesia and Melanesia) and the Native Americans. In doing so, the course aims to increase the student's awareness of local art museums and art resources, improve visual acuity and research skills, and enhance descriptive and writing skills. (ARI)

AR 1150. Art in the Galleries (3)

Field trips to the various fine arts galleries in the city for an in-depth study of the many modes of expression in art. (ARI)

AR 1151. Seeing Art: Context and Experience (1)

Field trips to and the discussion and analysis of art exhibited in galleries and museums. (ARI—To satisfy the core this course must be taken in combination with other AR, MS, or TA courses to equal 3 hours.)

AR 1200. Two Dimensional Studio: Drawing and Design (3)

This introductory course explores the techniques and principles of expressive composition in two dimensions. Through a series of projects in both design and representational drawing, the student becomes familiar with both a variety of media and the expressive possibilities of image making. Studio fee for materials. (ARI)

AR 1250. Three Dimensional Studio: Sculpture (3)

This course explores a fundamental and definitive human activity: the making of expressive objects. Through a series of projects using different materials and techniques the student develops an understanding of expressive design and the skills necessary to make his or her ideas a reality. Studio fee for materials. (ARI)

AR 1300. Painting I (3)

An introductory course in the expressive possibilities of painting in oils or acrylics and the techniques necessary for their achievement. The course emphasizes observation and originality of vision. Studio fee for materials. (ARI)

AR 1350. Ceramics I (3)

An introductory course in ceramics and pottery designed to give the student an understanding of terminology, historical development of the craft, basic construction techniques and an experience in three-dimensional art. Studio fee for materials. (ARI)

AR 1400. Basic Photography (3)

A lecture-discussion-demonstration course designed to acquaint students with the basis of photographic principles and techniques as they apply to media production. The technical thrust is the application of such practical techniques as: camera operation, exposing Black-and-White film, processing Black-and-White film and printing Black-and-White prints. The fundamental emphasis of this study is a basic understanding of the concepts and uses of the qualities of captured light in time. A 35mm, fully adjustable, single lens reflex (SLR) camera is required. Studio fee for materials. (ARI)

AR 1410. Color Photography (2)

Introductory course in the use of color in fine art photography. Emphasis is on 35mm transparencies. A 35mm, fully adjustable, single lens reflex (SLR) camera is required. Studio fee for materials.

AR 3050 (NS 3050). Scientific Illustration (3)

A study of the basic techniques necessary to produce preliminary and final illustrations suitable for publication of biological and technical subjects. Emphasis is placed on sketching, pen and ink drawings, continuous tone drawing, animal drawing, watercolor, printing techniques, layout and design, lettering and maps and graphs. Field trips to a zoo, a natural history museum and printing plant are planned. Students complete a number of major drawing assignments designed to give them the expertise needed to illustrate their own research as well as that of other workers. This course does not satisfy the natural science requirement. Lab fee for materials. Prerequisite: instructor approval.

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- AR 3200. Drawing and Design II** (3)
Continuation of AR 1200. A further development of visual perception and manual skills. Prerequisite: AR 1200 or equivalent. Studio fee for materials. (ARI)
- AR 3205. Graphic Arts** (3)
Graphic Arts is an upper-level course designed to accommodate advanced students interested in pursuing the creation of two-dimensional images/art works. Students taking this course will be expected to develop a project or series of projects to be undertaken over the duration of one semester. The student and instructor will discuss the conceptual and technical aspects of the work, determining the expectations surrounding the final output. The number of projects completed will be dependent upon what media are used and the amount of time required to execute an image or project. All students will keep a daily sketchbook/journal. All students will submit a one-page artist's statement at the close of the semester. May be repeated for credit. Studio fee for materials. Prerequisite: Drawing I (AR 1200), Painting I (AR 1300), or Photography I (AR 1400). (ARI)
- AR 3250. Sculpture II** (3)
Any art studio course is basically a matter of individual instruction. In Sculpture II the student can work on a project or series of projects in direct collaboration with the instructor. Studio fee for materials. Prerequisite: AR 1250 or equivalent. (ARI)
- AR 3300. Painting II** (3)
A further exploration of the possibilities of painting in oils or acrylics. Prerequisite: AR 1300 or equivalent. Studio fee for materials. (ARI)
- AR 3350. Ceramics II** (3)
Further work in ceramics and pottery with the opportunity to develop skill in wheelwork. Prerequisite: AR 1350 or equivalent. Studio fee for materials. (ARI)
- AR 3400. Photography II** (3)
This course investigates a variety of Black-and-White photographic techniques beyond those introduced in AR 1400. The student develops a portfolio which encompasses a wide span of endeavor. High contrast (litho), solarization, oil coloring toning and infrared techniques are used. A 35mm, fully adjustable, single lens reflex (SLR) camera is required. Studio fee for materials. Prerequisite: AR 1400 or equivalent. (ARI)
- AR 3450 (JN 3450). Photojournalism** (3)
This course explores the ability of photography to record news events, stories of human interest, and contemporary social issues. Photographic techniques with 35mm black and white film and printing is introduced and reviewed. The analysis and criticism of images, the editing of photos and text, and the creation of narrative through the combination of word and image are primary areas explored. In addition, ethical and legal issues in photojournalism are introduced and examined. A 35mm, fully adjustable, single lens reflex (SLR) camera is required. Studio fee for materials. Prerequisite: AR 1400 or JN 2000 or instructor approval.
- AR 3470 Alternative and Historic Processes in Photography** (3)
This intermediate photography course covers hand-coated emulsions and contact printed negatives. Students experiment with a variety of photographic formulas, some formulas dating back to the 1840s, when photography was first discovered, and some recent developments in alternative and non-silver processes. Course requirements may include a project of photographs, a portfolio of work at the end of the semester, and demonstrated knowledge of chemistry interactions of emulsions, developers, and clearing agents. Issues of chemical safety, use and disposal are included in the course. Students learn different methods of negative and image production in addition to the paper production, exposure and processing necessary for these formulas. Techniques may include, but are not limited to: salted paper printing, kallitype, Van Dyke Brown, platinum, palladium, cyanotype, gum bichromate, ziatype. Prerequisite: AR 1400 or instructor approval.
- AR 4400. Photography III** (3)
The student furthers professional and aesthetic goals by building a photographic portfolio geared to student's emphasis in photography. The course stresses professional preparation and training. Studio fee for materials. Prerequisite: AR 3400. (ARI)

BIOCHEMISTRY

(Departments of Biology and Chemistry)

<i>Professor</i>	Rev. James D. Wheeler, S.J., Ph.D.
<i>Associate Professor</i>	James M. Chapman, Ph.D. D. Philip Colombo, Jr., Ph.D. Janet Cooper, Ph.D. Dale W. Harak, Ph.D.
<i>Assistant Professor</i>	Lisa Felzien, Ph.D. Annie Lee, Ph.D. (Co-Director) Laura Salem, Ph.D. (Co-Director)

The goal of the biochemistry major is to give students a solid foundation in the sciences needed to understand the biological and chemical complexities in the processes of life. During the course of their studies students will develop the ability to think in an integrated manner and to look at problems from different perspectives. Additionally, they will learn the theory and application of the techniques of modern experimental biochemistry. Upon completion students will be able to engage in evaluative and critical thinking across the disciplines of chemistry and biology and integrate these disciplines into their chosen career paths or medical, professional, and graduate educations. Entering students will meet with an advisor from either the Biology or Chemistry Department to plan a curriculum tailored to their postgraduate aspirations and to help select the appropriate biology and chemistry courses.

The interdisciplinary nature of biochemistry requires that students study both biology and chemistry in order to understand the molecular processes of life. The major in biochemistry is designed to meet the needs of students interested in this interdisciplinary subject. Students completing a major in biochemistry will be prepared for careers in the pharmaceutical and biotechnology industries, for pursuit of graduate degrees in biochemistry and for entry into medical, veterinary, dental, or pharmacy schools. This degree program follows guidelines suggested by the American Chemical Society and the American Society of Biochemistry and Molecular Biology for an undergraduate degree in biochemistry.

Major Field of Concentration

A major in Biochemistry requires the following lower-division prerequisites: BL 1250 General Biology I, BL 1251 General Biology I Lab, BL 1300 General Biology II, BL 1301 General Biology II Lab, CH 2610 General Chemistry I & Lab, CH 2630 General Chemistry II & Lab, CH 2710 Organic Chemistry I, CH 2720 Organic Chemistry I Lab, CH 2730 Organic Chemistry II, CH 2740 Organic Chemistry II Lab, MT 1800 Calculus I, MT 1810 Calculus II, PH 2800/2810 General Physics I/General Physics I Lab, and PH 2900/2910 General Physics II/General Physics II Lab.

BL 1260 General Biology I, Honors and BL 1261 General Biology I Lab, Honors may be substituted for BL 1250 General Biology I and BL 1251 General Biology I Lab. CH 2650 Honors General Chemistry and Lab may be substituted for CH 2610 and CH 2630.

The following upper-division courses are required for the Biochemistry major: BL 3610 Genetics, BL 3620 Cell Biology, BL 3621 Cell Biology Lab, BL 3650 Molecular Biology, CH 3310 General Biochemistry I, CH 3320 Biochemistry Laboratory,

CH 3330 General Biochemistry II, CH 3340 Biochemistry Laboratory II, CH 3450 Analytical Chemistry, and CH 3550 Biophysical Chemistry. CH 3510 Physical Chemistry I and CH 3530 Physical Chemistry II may be substituted for CH 3550.

A student must also participate in at least one research class with either BL 3990 or CH 3990 Introductory Research Projects fulfilling this requirement. One seminar class is required and either BL 3960 Biology Seminar or CH 4960 Chemistry Literature Seminar can be taken. Three hours of an instrumental theory and application class are required and can be satisfied by taking one of the following classes: BL 4600 Biotechnology, CH 4430 Instrumental Analysis I, or CH 4450 Instrumental Analysis II.

A grade of C or better is required in each upper-division course of the major. (A grade of C- will not satisfy the requirement.)

Those students who are preparing for entry into graduate studies or industry should consult with their advisor to discuss which additional upper-division biology and chemistry classes to include in their programs.

BIOINFORMATICS (BI)

(Department of Biology and Department of Mathematics,
Computer Science and Physics)

<i>Associate Professor</i>	John Cigas, Ph.D. Janet Cooper, Ph.D.
<i>Assistant Professor</i>	Kevin Burger, M.S. (Co-Director) Lisa Felzien, Ph.D. (Co-Director) Laura Salem, Ph.D.

The Bioinformatics program at Rockhurst University prepares students for the rapidly developing interdisciplinary field of bioinformatics, which integrates theories and methods in molecular biology and computer science and enables the analysis of vast amounts of biological data. The program prepares students for graduate work in bioinformatics and for careers in pharmaceutical and biotechnology companies, government labs, and private research institutions.

The Bioinformatics major provides a strong background in both molecular biology and computer science. Students learn the language of molecular biology, including the important problems and techniques of this field. They also gain a background in computer science in order to use and build software systems which store and manipulate large biological datasets. Advanced research internships are available for students at the nearby Stowers Institute for Medical Research or the University of Missouri-Kansas City, which has Ph.D. programs in the biological sciences.

Major Field of Concentration

A major in Bioinformatics requires the following lower-division courses: BL 1250 General Biology I, BL 1251 General Biology I Lab, BL 1300 General Biology II, BL 1301 General Biology II Lab, CH 2610 General Chemistry I & Lab, CH 2630 General Chemistry II & Lab, MT 1800 Calculus I, MT 1510 Discrete Structures, CS 1110 Introduction to Programming, CS 1120 Introduction to Programming Lab, CS 2110 Computer Science Concepts, CS 2510 Data Structures, BI 2000 and BI 2200.

The following lower-division courses are recommended: MT 1810 Calculus II, PH 2800 General Physics I, PH 2810 General Physics I Lab, PH 2900 General Physics II, PH 2910 General Physics II Lab.

BL 1260 General Biology I, Honors and BL 1261 General Biology I Lab, Honors may be substituted for BL 1250 General Biology I and BL 1251 General Biology I Lab. CH 2650 Honors General Chemistry & Lab may be substituted for CH 2610 and CH 2630.

The following upper-division courses are required for the Bioinformatics major: BL 3610 Genetics, BL 3620 Cell Biology, BL 3621 Cell Biology Lab, BL 3650 Molecular Biology, CS 3320 Algorithm Design and Analysis, CS 3410 Database Management Systems, and BI 4200. Also required are at least nine credit hours of electives selected from the following courses: BL 4600 Biotechnology; CH 2710 Organic Chemistry I and CH 2720 Organic Chemistry I Lab; CH 3310 General Biochemistry I; CH 3330 General Biochemistry II; CS 4410 Software Development; CS 4810 Introduction to Computer Graphics; MT 3810 Linear Algebra.

A grade of C or better is required in each upper-division course required for the major. (A grade of C- will not satisfy the requirement.)

BI 2000. Introduction to Bioinformatics (3)
An introduction to bioinformatics with coverage of major problems in molecular biology and the use of computers in solving them. Topics will include biological databases and searches, sequence alignments, phylogenetic trees, genomics, proteomics and structure prediction, and mathematical and computer algorithms used in molecular biology. Prerequisite: A grade of C or better in both BL 1300 and CS 2110.

BI 2200. Introduction to Biostatistics (3)
Fundamental procedures and concepts in collecting, summarizing, presenting, analyzing, and interpreting data in the biological sciences. Topics include descriptive statistics, probability, distribu-

tions, sampling, estimation and hypothesis testing, nonparametric methods, regression analysis, and analysis of variance. Applications are stressed, and computer packages for data analysis are introduced. Prerequisite: A grade of C or better in BL 1300 and either MT 1190 or MT 1800.

BI 4200. Advanced Bioinformatics (3)
Advanced topics in bioinformatics to include more in-depth coverage of selected topics from BI 2000, including the application and development of bioinformatics tools. The student will complete a bioinformatics research project under the supervision of one or more faculty members. Prerequisite: A grade of C or better in BI 2000 and senior standing.

DEPARTMENT OF BIOLOGY (BL)

<i>Professor</i>	Marshall L. Andersen, Ph.D. (Chair) George M. O'Connor Jr., Ph.D.
<i>Associate Professor</i>	Mary F. Haskins, Ph.D. Janet Cooper, Ph.D.
<i>Assistant Professor</i>	Lisa Felzien, Ph.D. Chad Scholes, Ph.D. Laura A. Salem, Ph.D. Elizabeth I. Evans, D.V.M.

The biology department has two aims: first, to provide students preparing for careers in the biological disciplines with a firm and broad foundation in biology; second, to provide students interested in other areas of knowledge with an insight into the problems of life and living organisms.

The department also seeks to instill in the student a deep respect for research and a sound and thorough scholarship in the field of biology; to motivate and to direct the student in the principles of research, both in the laboratory and in literature, always with a view to promoting intellectual honesty. Courses can be used in preparation for health care fields.

Major Field of Concentration

All students majoring in Biology must take two semesters of general biology (BL 1250/1251 and BL 1300/1301), Genetics (BL 3610), Introduction to Research (BL 3910), and Advanced Principles of Biology (BL 4940). Students must also complete coursework in one of two tracks offered by the Biology Department. The macrobiology track is recommended for students considering graduate studies emphasizing anatomical, physiological, evolutionary, and ecological aspects of living organisms. The cell and molecular track is recommended for students intending to pursue graduate studies in cellular and molecular biology. Students intending to pursue post-graduate professional programs such as medicine, physical therapy, or occupational therapy may consider either track.

Macrobiology Track Requirements

BL 1250/1251 or BL 1260/1261	General Biology I or Honors Biology	3/1
BL 1300/1301	General Biology II	3/1
BL 3610	Genetics	3
BL 3200/3201	Invertebrate Zoology	2/1
BL 3350/3351	Plant Biology	2/1
BL 3400/3401	Comparative Vertebrate Anatomy	3/1
BL 3700/3701	General Physiology	3/1
BL 3xxx or BL 4xxx	One elective from Group D	3-4
BL 4xxx or BL 5xxx	One elective from Group E	3-4
BL 3910 or option	Introduction to Research	1
BL 4940	Advanced Principles of Biology	3
	Total hours	35-37

Group D

BL 3620/3621	Cell Biology	3/1
BL 3650	Molecular Biology	3
BL 3100/3101	Microbiology	3/1
BL 4420/4421	Histology	3/1
BL 4700	Immunology	3

Group E

BL 4810 (4811)	Ecology	3 + optional 1 hr. lab
BL 4800	Evolution	3
BL 5400/5401	Gross Anatomy	4/1 (Requires acceptance to PT/OT)

Cell and Molecular Biology Track Requirements

BL 1250/1251 or BL 1260/1261	General Biology I or Honors Biology	3/1
BL 1300/1301	General Biology II	3/1
BL 3610	Genetics	3

BL 3620/3621	Cell Biology	3/1
BL 3650	Molecular Biology	3
BL 4600	Biotechnology	3
BL 3xxx	One elective from Group A	3-4
BL 3xxx/4xxx	One elective from Group B (not from A)	3-4
BL 4xxx	One elective from Group C	3-4
BL 3910 or option	Introduction to Research	1
BL 4940	Advanced Principles of Biology	3
	Total hours	34-37
Group A		
BL 3100/3101	Microbiology	3/1
BL 3200/3201	Invertebrate Zoology	2/1
BL 3350/3351	Plant Biology	2/1
Group B		
BL 3100/3101	Microbiology	3/1
BL 3200/3201	Invertebrate Zoology	2/1
BL 3350/3351	Plant Biology	2/1
BL 3400/3401	Comparative Vertebrate Anatomy	3/1
BL 3450/3451	Embryology & Developmental Biology	3/1
BL 3700/3701	General Physiology	3/1
BL 4200	Parasitology	3
Group C		
BL 4800	Evolution	3
BL 4810 (4811)	Ecology	3 + optional 1 hr. lab

Students are urged to consult with the department regarding their program of study as early in their academic careers as they can (during freshman year if possible). A grade of C or better is required in each upper-division course of the major. (A grade of C- will not satisfy the requirement.) Those students interested in pursuing graduate or professional degree studies are strongly encouraged to complete CH 2710/2720 and CH 2730/2740 Organic Chemistry I/II, CH 3450 Analytical Chemistry, MT 1800 Calculus I, PH 2800/2810 and PH 2900/2910 General Physics I/II, PY 2100 Introduction to Statistics for the Behavioral Sciences and computer proficiency.

Minor Field of Concentration

The minor in biology consists of the following courses: BL 1250/1251, BL 1300/1301, and BL 3610. An additional minimum of nine hours of upper-division (BL 3xxx or BL 4xxx) courses in biology must be taken. Selection of these upper-division courses should be done with the advice of the Biology Department. A grade of C or better is required in each upper-division course of the minor. (A grade of C- will not satisfy the requirement.)

Several of the courses in this department are offered only once a year. Students should consult departmental faculty for any changes that may have been made in this list. Typically the courses listed below are offered either once a year, or in alternate years. Other departmental courses, with a few exceptions, are offered each semester.

Fall only

Honors General Biology I
Human Anatomy and Physiology II
Accelerated Human Structure and Function
Plant Biology
Comparative Vertebrate Anatomy
Molecular Biology
Ecology
Gross Anatomy
Animal Behavior (odd years only)
General Physiology

Spring only

Human Anatomy & Physiology I
Invertebrate Zoology
Cell Biology
Biotechnology
Embryology
Evolution
Histology (even years only)
Parasitology (odd years only)
Immunology (even years only)

BL 1150. Biology of the Contemporary Scene (3)

A course for non-science majors covering basic biological concepts and their application to current problems and philosophies. Lecture and discussion. Course is offered both semesters. For non-science majors. Corequisite: BL 1151. (SCI)

BL 1151. Biology of the Contemporary Scene Lab (1)

A laboratory course to be taken concurrently with BL 1150. This course provides laboratory exercises requiring the use of the scientific method to understand biological concepts. Emphasis is placed on approaches used by scientists to study biological problems. For non-science majors. Lab fee. Corequisite: BL 1150. (SCI)

BL 1250. General Biology I (3)

This course addresses selected basic biological concepts and principles within the framework of the scientific method and modern evolutionary theory. Emphasis is on cellular biology with topics including the basic chemistry, structure, regulation, energy transformation, photosynthesis, respiration, reproduction and genetics of living systems.

Coverage includes those cellular principles most important to the understanding of living organisms and (along with BL 1300 and 1301) provides the student with the foundation for the remainder of the courses of the department. Course is offered both semesters. Corequisite: BL 1251. (SCI)

BL 1251. General Biology I Lab (1)

A laboratory course to be taken concurrently with BL 1250. Exercises reinforce concepts taught in BL 1250. Lab fee. Corequisite: BL 1250. (SCI)

BL 1260. General Biology I, Honors (3)

A course in basic biological concepts and principles. In addition to the concepts covered in BL 1250, the course emphasizes independent investigative methods and the development of critical scientific methodology. Course is offered fall semesters. Prerequisite: Acceptance into honors program or department approval. Corequisite: BL 1261. (SCI)

BL 1261. General Biology I Lab, Honors (1)

Laboratory experiences emphasize independent research topics and development of research skills. Lab fee. Corequisite: BL 1261. (SCI)

BL 1300. General Biology II (3)

This second semester general biology course focuses on ecological and evolutionary concepts. Select phyla from all kingdoms are used to illustrate various concepts. Development of tissues, cells, and organs in various phyla are examined to illustrate the variety of mechanisms life forms have evolved to deal with issues such as: multicellularity, respiration, excretion, circulation, digestion, reproduction, sensory stimuli, protection, water and salt balance, movement, and defense. Lecture meets three hours per week. Course is offered both semesters. Prerequisite: BL 1250/1251. Corequisite: BL 1301.

BL 1301. General Biology II Lab (1)

Labs meet weekly for three hours and support concepts taught in lecture. Course is offered both semesters. Lab fee. Prerequisite: BL 1250/1251. Corequisite: BL 1300.

BL 2830. Introduction to Human Anatomy and Physiology I (4)

Introduction to anatomy and physiology of the human body. The course is designed specifically for Nursing students. (Pre-MPT or MOT students should not take this course.) Contents include General Biology topics such as cell chemistry, cell organelles, Mendelian genetics, elementary principles of ontogeny, mitosis and meiosis are included. Using a focus on homeostasis and normal anatomy and physiology, the course also includes the tissues, integumentary, nervous, skeletal, muscular and cardiovascular systems. Considerable focus on the composition and maintenance of body fluids. Course is offered spring semesters. CH 1050/1060 pre- or co-requisite or approval. Corequisite: BL 2831.

BL 2831. Introduction to Human Anatomy and Physiology I Lab (1)

Human anatomy is emphasized in the laboratory,

and studied in part through the dissection of a small mammal (cat, rabbit, etc.). Lab fee. Corequisite: BL 2830.

BL 2930. Human Anatomy and Physiology I (3)
Introduction to the anatomy and physiology of the human body. The course begins with a review of homeostasis, basic histology and the general body plan. The integumentary, skeletal, muscular, cardiovascular, respiratory and immune systems are then covered in detail. The study of each of these systems is organized around the central concept of homeostasis. Considerable time is devoted to the composition and maintenance of body fluids. Course is offered spring semesters. Prerequisite: BL 1250 or equivalent or approval. Corequisite: BL 2931.

BL 2931. Human Anatomy and Physiology I Lab (1)
The lab supports concepts and systems covered in the lecture. Human anatomy is emphasized in the lab and studied in part through the dissection of the cat. Lab fee. Prerequisite: BL 1250 or equivalent or approval. Corequisite: BL 2930.

BL 2940. Human Anatomy and Physiology II (3)
Sequential course to BL 2830 and 2930. Includes discussion of the anatomy and physiology of the remaining systems, including respiratory, endocrine, digestive, immunological, reproductive, and renal. Overview of the embryology of each system is also included. Course is offered fall semesters. Prerequisite: BL 2930 or BL 2830 or equivalent or approval. Corequisite: BL 2941.

BL 2941. Human Anatomy and Physiology II Lab (1)
Reinforces material covered in BL 2940 using experiments, models and prosections. Lab fee. Corequisite: BL 2940.

BL 2965. Accelerated Human Anatomy and Physiology (6)
A one-semester course in human anatomy and physiology designed for the accelerated nursing student with or without previous background in the subject. The course covers homeostasis, basic histology and general body design. Eleven body systems are covered in detail with considerable time devoted to composition and maintenance of body fluids. The lecture portion of the course is conducted online with exams and labs on campus. The lab portion of the course reinforces lecture material, using experiments, models, and dissections. Lab meets once a week. Lab fee. Prerequisite: BA or BS degree.

BL 3100. Microbiology (3)
The morphology, physiology and nutrition of micro-organisms and their role in nature and infection and immunity. Course is offered fall and

spring, and occasional summer semesters. Prerequisite: BL 1250 or BL 2830. Corequisite: BL 3101.

BL 3101. Microbiology Lab (1)
A study of the techniques of microbiology, isolation, cultivation, observation, identification and immunological principles and practices. Lab fee. Corequisite: BL 3100.

BL 3200. Invertebrate Zoology (2)
An in-depth study of the form, phylogenetic relationships, ecology, anatomy, special adaptation and evolution of protists and animals. Course is offered spring semesters. Prerequisite: BL 1300 or instructor approval. Corequisite: BL 3201. (SCII)

BL 3201. Invertebrate Zoology Lab (1)
Reinforces concepts from BL 3200 through microscope work, dissections and observations of living invertebrates. Lab fee. Corequisite: BL 3200. (SCII)

BL 3230. Animal Behavior (3)
An ethnological course studying the mechanics and evolution of behavior. The course includes historical ethology and its arguments; basic neural mechanisms; releasers; sign stimuli; learning theory; complex individual and social behaviors; species interactions and the evolution of behavior. Prerequisite: PY 1000 Introduction to Psychology and BL 1300, or instructor approval.

BL 3350. Plant Biology (2)
Introduction to the structure, functions, classification and phylogeny of the plant kingdom. Course is offered fall semesters. Prerequisite: BL 1300 or instructor approval. Corequisite: BL 3351.

BL 3351. Plant Biology Lab (1)
Reinforces concepts learned in BL 3350 through experiments and observation of living and preserved plants. Lab fee. Corequisite: BL 3350.

BL 3400. Comparative Vertebrate Anatomy (3)
A comparative study of the structure, function and development of vertebrate organ systems. Some emphasis is also placed on theories concerning the evolution of vertebrates based on anatomical comparisons. Prerequisite: BL 1300 or instructor approval. Corequisite: BL 3401.

BL 3401. Comparative Vertebrate Anatomy Lab (1)
Emphasizes, through dissection, the comparative and functional anatomy of organ systems in the shark, amphibian (salamander), reptile (turtle), bird and mammal (cat). Emphasis is also placed on dissection technique. Lab fee. Corequisite: BL 3400.

BL 3430. Seminar in Genetics (1)
A discussion of genetics papers of historical and current interest. Prerequisite: BL 3610 or concurrently.

- BL 3450. Embryology and Developmental Biology** (3)
The study of the origin and development of organisms (with emphasis on animals) through consideration of the embryonic processes and study of successive changes producing adult forms. Emphasis in lecture is on the nature of the processes which initiate and control development. Some time is also spent examining other developmental processes including aging, cancer and birth defects. Prerequisite: BL 2930 or BL 3400 or instructor approval. Corequisite: BL 3451.
- BL 3451. Embryology and Developmental Biology Lab** (1)
Emphasis in lab is on the sequential structural changes (morphogenesis) which occur during embryonic development in selected organisms including the sea urchin, frog, chick and pig. Some lab time is also devoted to experimental analysis of development. Lab fee. Corequisite: BL 3450.
- BL 3610. Genetics** (3)
Fall and Spring semester
A study of the principles of heredity and the operation of hereditary factors in the development of plants and animals. Lecture three hours a week. Prerequisite: BL 1300, or instructor approval.
- BL 3620. Cell Biology** (3)
A study of the structure, chemical and molecular, and function of the cell. While the eukaryotic cell and its components is the primary consideration, procaryotic cells are studied and compared with their evolved descendants. Prerequisites: BL 1250 or equivalent and CH 2630 or equivalent, or instructor approval. Corequisite: BL 3621.
- BL 3621. Cell Biology Lab** (1)
The student is introduced to those investigative techniques which are used in molecular and cell studies such as gel electrophoresis, affinity chromatography, enzyme and ELISA assays, blotting techniques, polymerase chain reaction, genetic engineering, DNA fingerprinting, cell surface receptor identification and other pertinent techniques unique to cell investigation. Lab fee. Corequisite: BL 3620.
- BL 3650. Molecular Biology** (3)
A combined lecture and laboratory for the study of the chemical nature of DNA and the mechanisms and effects of gene expression. The molecular biology of prokaryotic organisms, eukaryotic organisms, and viruses will be examined, with an emphasis on genetic recombination, mapping, and expression. Advanced topics, such as the genetics of cancer and developmental genetics, will be approached through the analysis of current research in these fields. Prerequisite: BL 3610.
- BL 3700. General Physiology** (3)
A comparative study of variations in, and adaptation to, physiological problems presented to animals and plants. Although cell physiology is noted, emphasis is placed upon the organismic level. All eleven systems are covered. Prerequisites: BL 1300 or instructor approval. Corequisite: BL 3701.
- BL 3701. General Physiology Lab** (1)
A laboratory course to reinforce the concepts learned in BL 3700. Lab fee. Corequisite: BL 3700.
- BL 3900. Biology Field Trip** (2)
An opportunity for biology majors to be exposed to the major ecosystems of North or Central America. A two-week intensive field experience that is prefaced by a semester-long weekly seminar discussing the uniqueness and general ecology of each ecosystem/biome to be visited on the trip. Areas visited have included Florida and the Keys, the desert southwest, montane regions of Colorado, Yellowstone National Park, and the Boundary Waters of Minnesota. One credit hour for the seminar and one credit for the field trip. Under extraordinary circumstances a student may take, with permission, the course for one credit hour for both seminar and trip. No more than 4 hours from this listing may be counted towards a biology major for any individual student.
- BL 3910. Introduction to Research** (1)
A course in the proper approach to research including library utilization, computer "search techniques" and experimental design. Each student is taught to complete all the steps necessary to implement a scientific research program. Prerequisite: Sophomore standing.
- BL 3960. Biology Seminar** (1)
Presentations by junior and senior students on a topic chosen each semester. Students are taught basic library search skills and are familiarized with Linda Hall Library. Attendance is open to all faculty and students.
- BL 3990. Research Projects, Introductory** (1-3)
The student plans and attempts a series of original laboratory investigations of a scientifically significant problem planned in weekly consultation with the supervising faculty member, conducts the necessary literature searches, maintains a professional style laboratory notebook, makes at least one oral presentation of results, and prepares a research report according to standards established by the department. Lab fee. Prerequisite: Instructor approval.
- BL 4200. Parasitology** (3)
A combined lecture and laboratory for the study of animal parasites. Emphasis includes the evolution of parasitism, host-parasite ecology, parasites important to humans and diagnostics. Lab fee. Prerequisite: BL 1300 or equivalent or instructor approval.

- BL 4300. Plant Diversity** (3)
Principles of classification of plants, use of keys, identification of local angiosperm flora. Prerequisite: BL 3350 or equivalent or instructor approval. Corequisite: BL 4301.
- BL 4301. Plant Diversity Lab** (1)
The laboratory includes several field trips to study the plants in their natural habitat. Lab fee. Corequisite: BL 4300.
- BL 4420. Histology** (3)
The functional anatomy of vertebrate tissues. Emphasis in lecture is placed on general and specific characteristics of tissues on both microscopic and ultramicroscopic levels, development of tissues (histogenesis) and changes in tissues occurring during an organism's lifetime. Offered spring semesters of even-numbered years. Prerequisite: BL 3400 or equivalent. Corequisite: BL 4421.
- BL 4421. Histology Lab** (1)
The laboratory emphasizes practical aspects of histology including microscopy, histochemistry and histopathology. Lab fee. Corequisite: BL 4420.
- BL 4600. Biotechnology** (3)
A study of the techniques that are being used to rapidly advance the fields of molecular biology, medicine, genetics, and all of the biological sciences. This course combines lecture with laboratory to fully teach the theory and application of current techniques for exploring cell and molecular biology. Techniques considered will include DNA sequencing, restriction mapping, protein and DNA purification, cell culture, bioinformatics and other modern techniques. Lecture and laboratory. Lab fee. Prerequisite: BL 3610 or equivalent.
- BL 4700. Principles of Immunology** (3)
A combined lecture and laboratory which studies the mechanisms involved in the response of organisms to foreign organisms or other agents. Specific and non-specific factors in immunity, natural and artificial immunity, the nature of antigens and antibodies and their reactions both in vivo and in vitro, immunogenetics, as well as the immunology of tumors and grafts are considered. Lab fee. Prerequisite: BL 1250 or equivalent or instructor approval.
- BL 4710. Human Reproductive and Developmental Physiology** (2)
A short course on the biology of human reproduction from gamete production and fertilization to implantation; formation of the embryo and the necessary physiology for the maintenance of both the maternal and fetal units in gestation. Prerequisite: BL 2940 or BL 3400 or instructor approval.
- BL 4800. Evolution** (3)
A study of the evidence and mechanisms of evolution of all organisms. Basically a course in the theory of evolution including Hardy-Weinberg equilibria, genetic drift, niches and geographic, genetic and biological speciation. Prerequisite: BL 1300 or equivalent or instructor approval. (SCII)
- BL 4810. Ecology** (3)
A study of the composition, dynamics, development and distribution of the abiotic and biotic parameters of natural populations and communities. Lecture three hours a week. Prerequisites: BL 3200, BL 3350 or instructor approval.
- BL 4811. Ecology Laboratory** (1)
Field-intensive course with instruction in proper applications of statistics to ecological problems, sampling techniques in forest, grasslands, streams, ponds and lakes, and sampling from major taxons of plants, animals, fungi and protista. Lab fee. Corequisite: BL 4810 or instructor approval.
- BL 4940. Advanced Principles of Biology** (3)
The capstone course for biology will incorporate student-led seminars as starting points for discussions reviewing and integrating the major concepts of biology as applied across all kingdoms. Seminar and discussion. Prerequisite: Senior standing.
- BL 4990. Research Projects, Advanced** (1-3)
The student plans and attempts a series of original laboratory investigations of a scientifically significant problem planned in weekly consultation with the supervising faculty member, conducts the necessary literature searches, maintains a professional style laboratory notebook, makes at least one oral presentation of results, and prepares a research report according to standards established by the department. Lab fee. Prerequisite: Instructor approval.
- BL 5400. Gross Anatomy** (4)
An integrated regional approach to the study of the structure and function of the human body, with emphasis on the musculoskeletal and peripheral nervous system. The study of the fundamental tissues, organs, and other systems of the body cavities is also included. Prerequisite: acceptance into occupational therapy education or physical therapy education program. Corequisite: BL 5401.
- BL 5401. Gross Anatomy Lab** (1)
Meets twice a week. Reinforces concepts from lecture through prosected material, bony specimen, radiographs, and palpation of living subjects and supervised dissection of human cadavers. Lab fee. Corequisite: BL 5400.

See Natural Sciences section for additional course offerings.

BUSINESS COMMUNICATION

(Department of Communication and Fine Arts)

<i>Associate Professor</i>	Peter J. Bicak, Ph.D. (Chair)
<i>Assistant Professor</i>	Laura A. Janusik, Ph.D. Michael McDonald, Ph.D. (Chair) Sam Mwangi, Ph.D.

The Business Communication degree program is an interdisciplinary major that combines coursework in English, Business and Communication. The Bachelor of Arts degree will be conferred upon completion of the prescribed curriculum.

Its goal is consistent with the role and scope of the Rockhurst University tradition of developing sound academic programs to meet the needs of the community and of developing programs that will enhance the job outlook for the liberal arts graduate. There is unity in the program through the integrated coursework that explores various means by which a liberal arts student may apply education to professions and careers or graduate study.

The curriculum is not designed to develop an expertise in any specific area, but its value resides in the approach of rather extensive coverage in a variety of pertinent areas. As the curriculum is prescribed, it encompasses a number of core courses and electives, which are chosen in consultation with the major advisor.

Major Field of Concentration

The lower-division requirements for the Business Communication major include CT 2000, CT 2040, CT 2200, JN 2000, AC 2000, EC 2000, EC 2100, and MG 1900. One three-hour statistics course is required (PY 2100, BUS 2200, MT 3400 or MT 3410). Two semesters of college-level study of one language other than English are also required. The language requirement may be fulfilled by completing two semesters of college-level literature in one language other than English.

Students may choose one of the two tracks available in the Business Communication major: Communication Theory or Media. The upper-division Communication requirements (9 hours) for both tracks include: CT 4350, CT 4860 and CT 4940.

Additional upper-division Communication requirements (6 hours) for each track are as follows:

- 1) **Communication Theory track:** Required upper-division courses are CT 4870 and one of the following: CT 3000, CT 3300, CT 3840 or CT 3850.
- 2) **Media track:** Required upper-division courses are CT 4890 and one of the following: CT 3880 or CT 3900.

Writing (12 hours): The upper-division writing requirements for both tracks include EN 3160, EN 3180, and two electives in a 3000-4000-level English or Journalism writing course.

Business (9 hours): The upper-division business requirements for both tracks include FN 3000, MK 3000, and one upper-division Management (MG) or Marketing (MK) elective.

A grade of C or better is required in each upper-division course required for the major. (A grade of C- will not satisfy the requirement.)