Biology

Department of Biology and Environmental Science
Website: http://www.marietta.edu/~biol/
Chair: Dr. Peter E. Hogan (hoganp@marietta.edu)
Associate professors: Steven R. Spilatro, David G. McShaffrey, Almuth H. Tschunko; Assistant professor: David C. Brown; Lecturer: Tanya K. Jarrell
Secretary: Judith Dunn

Requirements for a major in Biochemistry: Biology 101, 105, 131, and three other courses in Biology selected from 202, 309, 330, 420, and 430; Chemistry 131-134, 231, 303-306, 420, and 422; Biology 490 and 491 or Chemistry 495 and/or 496; Mathematics 125; and Physics 211, 212. [Note: Students planning to attend graduate school in biochemistry are advised to take one semester of physical chemistry (Chemistry 331), an additional semester of calculus (Mathematics 126), and General Physics (Physics 221 and 222) instead of College Physics (Physics 211, 212). Biology 420 is recommended for students interested in graduate school or in working in a genetics laboratory].

General Biology

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>BIOL 101</td>
<td>3</td>
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<tr>
<td>BIOL 105</td>
<td>3</td>
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<tr>
<td>BIOL 131</td>
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Biology Electives: Any 3 of the following

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>BIOL 202</td>
<td>3</td>
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<tr>
<td>BIOL 309</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 420</td>
<td>3</td>
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<td>BIOL 430</td>
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Chemistry:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>CHEM 131,133</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 231</td>
<td>3</td>
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<tr>
<td>CHEM 304,306</td>
<td>6</td>
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Calculus

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<tr>
<th>Course</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>MATH 125</td>
<td>4</td>
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Physics

<table>
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<tr>
<th>Course</th>
<th>Credit Hours</th>
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<tr>
<td>PHYS 211</td>
<td>8</td>
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Senior Capstone: One of the following

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>BIOL 490, 491</td>
<td>3</td>
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<tr>
<td>or</td>
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<tr>
<td>CHEM 495, 496</td>
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Total 56 to 58 Hours
Requirements for a major in Biology: 40 hours in Biology to include Biology 101, 102, 105, 106, and 131; Internship or Tutorship (Biology 497 or 498); Library Research I and II (Biology 480 and 481) or Biology Research I and II (Biology 490 and 491); one cellular course (Biology 309 or 330); one organism course (Biology 203 or 212); one organism course (Biology 220, 222, 311, or 312); one population course (Biology 318, 320, or 450); one plant course (Biology 311 or 312); one animal course (Biology 203, 212, 220, 222, or 320); one field course (Biology 220-221, 222-223, 311, 312, 318-319, or 450); one experimental course (Biology 309, 318 - 319, 320 - 322, or 420); and an additional selection of courses from Biology curriculum to total 40 hours of Biology; Chemistry 131 - 134, and Chemistry 303 and 305; one Computer Science course (105 or higher); and one Mathematics course (124 or higher) or one Statistics course (Psychology 285 or Math 123).

General Biology 12 Hours
BIOL 101
BIOL 102
BIOL 105
BIOL 106
BIOL 131
BIOL 497 or 498

Biology Distributions: Complete Each Division Requirement

Cellular: Either of the following 3 or 4 Hours
BIOL 309
BIOL 330

Organ: One of the following 3 or 4 Hours
BIOL 203
BIOL 212

Organism: One of the following 3 or 4 Hours
BIOL 220
BIOL 222
BIOL 311
BIOL 312

Population: One of the following 3 or 4 Hours
BIOL 318
BIOL 320
BIOL 450

Plant: One of the following 4 Hours
BIOL 311
BIOL 312

Animal: One of the following 3 to 4 Hours
BIOL 203
BIOL 212
BIOL 220

Field: One of the following 4 Hours
BIOL 220 & 221
BIOL 222 & 223
BIOL 311
BIOL 312
BIOL 318 & 319
BIOL 450

Experimental: One of the following 4 Hours
BIOL 309
BIOL 318 & 319
BIOL 320 & 322
BIOL 420

Senior Capstone: Either option 2 to 3 Hours
Library Research Project:
BIOL 480
BIOL 481
or
Research Project:
BIOL 490
BIOL 491

Biology Electives: An additional selection of courses from Biology Curriculum to total 40 hours of Biology.
BIOL 111 Organisms and Environment
A laboratory course in which students apply the scientific method to a variety of topics in biology and environmental science. Students design and carry out experiments using various scientific tools and techniques, including computers and sensors to gather and analyze data. There will be a rigorous writing component, e.g., lab reports.
Prerequisite: Geology 101 and concurrent registration in Biology 102.
Credit: 1 Hour.

BIOL 131 Introduction to Cellular and Molecular Biology
Fundamental topics in cellular and molecular biology, including chemistry of life, cell structure and function, cellular metabolism, cell reproduction, DNA, RNA, protein synthesis, and genetics.
Prerequisite: Biology 101.
Credit: 3 Hours.

BIOL 202 General Microbiology
Survey of eukaryotic and prokaryotic microorganisms. Emphasizes structure and physiology of bacteria, and their roles as agents of disease, contaminants in food and water, and applications in modern biotechnology industries. Includes bacterial genetics, virology, and immunology. Laboratory exercises include cultivation and identification of bacteria, metabolism, food and water analysis, and virology.
Credit: 4 Hours.

BIOL 203 Human Physiology
Lecture course in the physiology of humans. Topics include membrane physiology, control of cellular activity, digestion, metabolism and temperature regulation, nerve and muscle physiology, circulation, immunity, respiration, neurophysiology, and endocrinology.
Recommended prerequisite: Biology 212.
Credit: 3 Hours.

BIOL 212 Human Anatomy
Lecture and laboratory course in gross anatomy of humans. Structures of major organ systems elucidated through lecture, use of A.D.A.M. software and anatomical models with possible occasional dissection of nonhuman cadavers and/or nonhuman cadaver parts.
Credit: 4 Hours.

BIOL 220 Invertebrate Zoology
Exploration of 95 percent of animal species, from microscopic world of rotifers to the intricate colors of a butterfly’s wing. Investigation of anatomy, taxonomy, ecology, and behavior of these fascinating organisms.
Credit: 3 Hours.

BIOL 221 Invertebrate Zoology Laboratory
Local field trips to collect invertebrates for study. Laboratory identification and examination of collected material.
Prerequisite: Concurrent enrollment in Biology 220.
Credit: 1 Hour.

BIOL 222 Vertebrate Zoology
The study of the behavioral and morphological adaptations of the vertebrates. We will also examine the taxonomy and ecology of vertebrate animals.
Credit: 3 Hours.

BIOL 223 Vertebrate Zoology Laboratory
Field trips to observe native fish, amphibians, reptiles, birds and mammals. Laboratory identification and examination of collected material.
Prerequisite: Concurrent enrollment in Biology 222
Credit: 1 Hour.

BIOL 285 Applied Nutrition
Chemical composition and importance of various foods as digested and absorbed by the body. Human energetics and nutrient requirements as critical components of balanced diet. Dietary planning for disease/disorder prevention and management, emphasize athlete nutrition. (Also listed as Sports Medicine 285.)
Prerequisite: Biology 101 or written permission of instructor.
Credit: 3 Hours.

BIOL 309 Cell Biology
Examines the relationship between cell structure and function. An emphasis on membrane structure, cell transport, cytoskeleton, gene expression and regulation, cell division, and cellular causes of cancer. Laboratory exercises involve techniques used in the study of cell biology, including histology, spectrophotometry, cell fractionation, tissue culture, electrophoresis, and immunochemistry.
Prerequisites: Chemistry 131 - 134 and Biology 131.
Credit: 4 Hours.

BIOL 311 Flowering Plants
Identification, uses, and ecological roles of trees, shrubs, and wildflowers are covered during field trips. Class covers plant structure, adaptations, classification, economically important plants and physiology.
Prerequisites: Biology 101 and 102, or written permission of instructor.
Credit: 4 Hours.
BIOL312  Lower Plants
Seaweeds, toadstools, and horsetails. Common yet overlooked organisms (including algae, mushrooms and other fungi, lichen, liverworts, mosses, horsetails, ferns, Ginkgo, and conifer trees) as well as spring wildflowers. Plant identification and ecological roles covered during field trips. Biology of each group and examples of economically useful or harmful members covered in class.
Prerequisites: Biology 101 and 102, or written permission of instructor.
Credit: 4 Hours.

BIOL318  Ecology
How animals and plants make their way in the world, ranging from struggle of individual organisms with their surroundings to interactions of populations and communities.
Prerequisite: Computer Science 105 or higher (CSCI 210 recommended).
Credit: 3 Hours.

BIOL319  Ecology Laboratory
Field-oriented investigations of local ecosystems designed to reinforce principles covered in Biology 318.
Prerequisites: Concurrent registration in Biology 318.
Credit: 1 Hour.

BIOL320  Animal Behavior
A lecture course dealing with the principle methods of animal behavior. Includes the history of animal behavior, “nature-nurture controversy,” major behavioral concepts, nervous and endocrine control of behavior, development of behavior, and such specific behaviors as aggression, biological rhythms, communication, orientations, predator/prey relationships, and social behavior. Offered alternate years.
Prerequisite: Biology 101/102/105/106 recommended.
Credit: 3 Hours.

BIOL322  Animal Behavior Laboratory
Examination of basic invertebrate and vertebrate behaviors in a highly experimental framework. Offered alternate years.
Prerequisite: Concurrent enrollment in Biology 320.
Credit: 1 Hour.

BIOL325  Biology of Aging
Theories of the causes of aging. Cellular aging and major body systems are discussed in reference to normal functions and changes that occur in response to the aging process.
Prerequisite: Biology 101/105/203 recommended.
Credit: 3 Hours.

BIOL330  Genetics
Modern genetics including Mendelian and other patterns of inheritance, population genetics, genetic mapping, DNA and gene structure and function, genetic diseases, and introduction to genetic engineering.
Prerequisite: Biology 131.
Credit: 3 Hours.

BIOL401  Advanced Human Anatomy
Detailed study of musculo-skeletal system, joint structures, and special nerves. Other organ systems may be viewed. Human cadaver utilized for laboratory component. Includes demonstration dissections. (Also listed as Sports Medicine 401.)
Prerequisites: Biology 212; junior or senior standing; and written permission of instructor.
Credit: 2 Hours.

BIOL420  Biotechnology
Fundamentals and application of molecular genetics and genetic engineering. In-depth look at recombinant DNA, gene structure and expression, mutations, mobile elements, and viruses as they apply to biotechnology in agriculture, industry, and medicine. Laboratory covers fundamental techniques of molecular genetics. Offered alternate years.
Prerequisites: Biology 131; and Chemistry 131-4.
Recommended prerequisite: Biology 330.
Credit: 4 Hours.

BIOL430  Immunology
Functions and mechanisms of immune system, including major histocompatibility complex and humoral, cell-mediated and complement immune responses. Disease resistance, immunization, organ transplant rejection, autoimmune diseases, cancer immunology, and AIDS.
Prerequisites: Biology 131 and Chemistry 131-4.
Recommended prerequisite: Biology 309.
Credit: 3 Hours.

BIOL450  Aquatic Biology
Aquatic organisms and ecosystems, ranging from freshwater to oceans. Physics of life in water, water chemistry, and survey of aquatic habitats. Laboratory investigates these topics in local freshwater systems. Offered spring semester, alternate years.
Prerequisite: Biology 318. Recommended prerequisites: One or more of Biology 220, 222, and 312.
Credit: 4 Hours.

BIOL480  Biology Library Research I
Students pursue library research on a topic agreed upon between the student and the faculty in the Biology Department. This endeavor enables students to apply their knowledge of biology in a theoretical manner to a specific area of biology. Culmination of this experience is in Biology 481. (Either this course or Biology 490 is required of all senior biology majors).
Prerequisites: Biology major and Senior status.
Credit: 1 Hour.

BIOL481  Biology Library Research II
The library research done in Biology 480 is written in scientific form and presented in a formal seminar in the Biology Department. (Either this course or Biology 491 is required of all Senior biology majors.)
Prerequisite: Biology 480 or written permission of the chair of the Biology Department.
Credit: 1 Hour.
Career Planning: From Major to Career, College 200, will
challenge students to articulate their strengths and skills
through self-assessments and research projects. This endeavor also requires the student to do an extensive review of
the relevant literature. Culmination of this experience is in
College 491. (Either this course or College 480 is required of
all Senior biology majors.)
Prerequisites: Biology or Biochemistry major and Senior status.
Credit: 1 Hour.

Career Planning: The Job Search, College 400, will
assist students in the internship/job search and cover all
avenues of job and internship searches, résumé writing, cover
letter writing, interviewing—to include mock interviews and
informational interviews, follow-up, evaluating offers, salary
negotiation, and on-the-job issues.

Broadcasting
(See Mass Media)

Business
(See Economics, Management and Accounting)

BIOL490  Biology Research I
Students pursue an “original,” hands-on, laboratory, and/or
field research project in biology. This endeavor enables stu-
dents to apply their knowledge of biology to an actual research
project through application of the scientific method. This
endeavor also requires the student to do an extensive review of
the relevant literature. Culmination of this experience is in
Biology 491. (Either this course or Biology 480 is required of
all Senior biology majors.)
Prerequisites: Biology or Biochemistry major and Senior status.
Credit: 1 Hour.

BIOL491  Biology Research II
Hands-on research done in Biology 490 is written in scientific
form (although actual publication is not required) or presenta-
tion at a poster session, and presentation of research results will
be made in a formal seminar in the Biology Department.
(Either this course or Biology 481 is required of all Senior biol-
ogy majors.)
Prerequisite: Biology 490.
Credit: 2 Hours.

BIOL495  Directed Research
Instructor-directed student research; research area determined
in consultation between student and instructor.
Prerequisite: Junior or Senior standing, or written permission
of instructor.
Credit: 1 or more Hours.

BIOL497  Internship
Internships provide credit for educational value of certain work
experiences. Such internships are worked out on an individual
basis.
Prerequisite: Junior or Senior standing.
Credit: 1 to 3 Hours.

BIOL498  Tutorship
Tutorships provide credit to students who learn by helping
other students to learn. Usually achieved by assisting in
Biology Department laboratory.
Prerequisite: Junior or senior standing.
Credit: 1 Hour.

Career Planning
Director of the Career Center: Ms. Kathleen Fisher (fisherk@marinetta.edu)
Instructor: Kenneth Bailey
Secretary: Marilyn Pottmeyer

The Career Center services the career needs of all students and alumni/ae. As part of its program, the Center pro-
vides two courses carrying academic credit.

Career Planning: From Major to Career, College 200, will
challenge students to articulate their strengths and skills
through self-assessments and research projects. There will be
a great deal of interaction with instructors, classmates, guest
speakers and career mentors outside of the classroom to rein-
force research and supplementary reading and writing assign-
ments. There will be regular reading and writing assignments
covering various career development theories to give students
insight into sharpening decision making skills and focussing on
the variety of paths available to achieving career satisfaction
beginning with an academic major.

This course is primarily designed for students in their
freshman or sophomore years and to complement the First Year
Seminar, FYSE 101. However, the seminar is not a prerequi-
site for the course.

Career Planning: The Job Search, College 400, will

COLLEGE 200 Career Planning: From Major to Career
Meeting once weekly in the Spring semester, this course is
designed for students who are undecided about an academic
major and career direction, as well as students who have cho-
sen a major and are either not sure they have made an appro-
priate choice, or not sure what they can do with their chosen
major upon graduation. The course explores the processes and
theories of career development while utilizing a variety of
resources in its instruction including self assessment tools, text-