BIOLOGY (BIO)

Degree offered: B.A or B.S.
The biology major is divided into 3 Tracks. **Track I** prepares students for entry-level careers and for some levels of clinical laboratory programs. **Track II** prepares students for graduate study, professional schools, and for a variety of careers in the sciences. **Track III** allows students to receive a bachelor's degree in Biology while earning her ADN.

Requirements for the Biology Major Track I
Biology Major Track I consists of **47 hours**.
A. Thirty-six (36) hours of biology including:

BIO 101	Principles of Biology I	(4 hours)
BIO 104	Principles of Biology II	(4 hours)
BIO 309	Genetics	(3 hours)
BIO 322	Molecular Biology	(3 hours)
BIO 323L	Molecular Genetics Lab	(2 hours)
BIO 400	Seminar	(1 hour)
Two (2) 300-400 level Biology electives		(hours vary)
Additional departmentally approved BIO electives to reach 36 hours of BIO credit		(hours vary)

B.	MAT 111	Precalculus Algebra	(3 hours)
	Or any course above MAT 111 (excluding MAT 231)		

C.	CHE 101	General Chemistry I	(4 hours)
	CHE 103	General Chemistry II	(4 hours)

Requirements for the Biology Major Track II
Biology Major Track II consists of **63 hours**.
A. Thirty-six (36) hours of biology including:

BIO 101	Principles of Biology I	(4 hours)
BIO 104	Principles of Biology II	(4 hours)
BIO 309	Genetics	(3 hours)
BIO 322	Molecular Biology	(3 hours)
BIO 323L	Molecular Genetics Lab	(2 hours)
BIO 400	Seminar	(1 hour)
Two (2) 300-400 level Biology electives		(hours vary)
Additional departmentally approved BIO electives to reach 36 hours of BIO credit		(hours vary)

B.	MAT 121	Precalculus Trigonometry ***OR***	(3 hours)
	MAT 151	Calculus I	(3 hours)
C.	CHE 101	General Chemistry I	(4 hours)
	CHE 103	General Chemistry II	(4 hours)
	CHE 201	Organic Chemistry I	(4 hours)
	CHE 202	Organic Chemistry II	(4 hours)
D.	PHY 201	General Physics I	(4 hours)
	PHY 202	General Physics II	(4 hours)

Requirements for the Biology Major Track III

Biology Major Track III (Associate Degree in Nursing Option) consists of **134-135 hours**.

A. Thirty-six (36) hours of biology including:

BIO 101	Principles of Biology I	(4 hours)
BIO 104	Principles of Biology II	(4 hours)
BIO 201	Human Anatomy and Physiology I	(4 hours)
BIO 202	Human Anatomy and Physiology II	(4 hours)
BIO 220	General Microbiology	(4 hours)
BIO 309	Genetics	(3 hours)
BIO 322	Molecular Biology	(3 hours)
BIO 323L	Molecular Genetics Lab	(2 hours)
BIO 400	Seminar	(1 hour)
One additional 300-400 level elective		(hours vary)

B. Associate Degree in Nursing Program courses, which count as part of the 36 required hours for a Biology major:

NUR 102	Health Promotion & Assessment	(1 hour)
NUR 103	Intro to Pharmacology and Drug Dosage	(1 hour)
NUR 104	Advanced Pharmacology	(2 hours)

C. MAT 111 Precalculus Algebra (3 hours)
Or any course above MAT 111 (excluding MAT 231)
(substitutes for MAT 103 in the ADN curriculum)

D. CHE 101	General Chemistry I	(4 hours)
CHE 103	General Chemistry II	(4 hours)

E. Additional requirements for ADN (48 hours)
Includes: NUR courses not listed above
GEC courses required for ADN
REL 331 Theological Ethics

F. Additional General Education Curriculum (34 hours)
Track III students may apply PSY 204 Human Growth and Development to Goal II of the GEC. Track III students are NOT required to take HPE 121 Health and Fitness

G. No minor is required in Track III.

Requirements for the Biology Minor

The **Minor in Biology** consists of **24 hours** including the following:

BIO 101	Principles of Biology I	(4 hours)
BIO 104	Principles of Biology II	(4 hours)
BIO 309	Genetics	(4 hours)

Thirteen (13) hours of electives, including seven (7) hours of 300- 400-level courses.

Requirements for the Marine Science Minor

A **Minor in Marine Science** consists of the following **32 hours**:

A.	BIO 101	Principles of Biology I	(4 hours)
	BIO 303	Ecology	(4 hours)
	BIO 401	Ornithology	(3 hours)
B.	CHE 101	General Chemistry I	(4 hours)
	CHE 103	General Chemistry II	(4 hours)

C. Twelve (12) semester hours of upper-level Marine Science coursework.

NOTE: Marine Science courses are taught at the Dauphin Island Sea Laboratory; no Marine Science courses are taught at Judson College. MAR information is available from the Head of the Biology Department.

Course Descriptions

BIO 101 PRINCIPLES OF BIOLOGY I: 4 hours
An introduction to the fundamental principles of biology through the investigation of living organisms at the cellular, organismal, and population level. (Lec. 3, Lab. 2)

BIO 104 PRINCIPLES OF BIOLOGY II: 4 hours
Further investigation into the foundational principles of living organisms at the cellular, organismal, and population level as well as the underlying processes that shape cellular and environmental systems. (Lec. 3, Lab 2)
Prerequisite: BIO 101

BIO 105 GENERAL BOTANY: 4 hours
General botany is a lecture, laboratory and field study course on plants and related groups. Emphasis is placed on molecular and cellular biology, photosynthesis, morphology, and a systematic survey of the plant divisions, especially vascular plants. (Lec. 3, Lab. 2).

BIO 121, 221, 321 MEDICAL TERMINOLOGY: 1 hour per course
A blended course consisting of orientation, one-on-one instruction, and web-enhanced study of the language of medicine emphasizing basic word structure, pronunciation, definitions and applications. Designed for students in health related programs.

BIO 201 HUMAN ANATOMY AND PHYSIOLOGY I: 4 hours
A study of the structure and function of the human body. Includes all body systems and their physiology. Emphasis is given to basic chemistry, histology, metabolism, nutrition, and special senses. Includes a two (2) hour weekly laboratory. (Lec. 3, Lab. 2)

BIO 202 HUMAN ANATOMY AND PHYSIOLOGY II: 4 hours
A study of the structure and function of the human body. Includes all body systems and their physiology. Emphasis is given to basic chemistry, histology, metabolism, nutrition, and special senses. Includes a 2 hour weekly laboratory. (Lec. 3, Lab. 2)
Prerequisite: BIO 201

BIO 215 ADVANCED MICROSCOPY & INSTRUMENTATION: 1 to 2 hours

An introduction to laboratory instruments and techniques, including theory, practice, and safety.
Prerequisite: BIO 104, CHE 101

BIO 220 GENERAL MICROBIOLOGY: 4 hours

A study of bacteria, viruses, fungi, and protozoa with an emphasis on those species causing disease. Two 2 hour laboratories each week. (Lec. 2, Lab. 4)

BIO 303 GENERAL ECOLOGY: 4 hours

A study of organisms in their relations to each other and to the environment. Emphasis is placed on basic concepts and principles, natural habitats, and alteration of the environment by man. Students are introduced to major environmental problems, regulating agencies, and conservation organizations. (Lec. 3, Lab 2) (Cross-listed with MAR 303)
Prerequisite: BIO 101 OR BIO 105

BIO 304 MICROBIOLOGY: 4 hours

A study of bacteria, viruses, fungi, and protozoa with an emphasis on those species causing disease. Microbial physiology, metabolism, genetics, and ecology are also discussed. Classification and identification of microbes is emphasized. (Lec. 3, Lab. 4).
Prerequisite: BIO 101 OR BIO 105

BIO 306 BIOETHICS: 3 hours

An investigation of bioethics involving an understanding of concepts of ethics, morality, religion, free will, and social mores. Topics include reproductive technologies, genetic research, euthanasia, death and dying, organ transplants, fetal tissue research, and selected medical case studies. Medical professionals will participate in the course.
Prerequisite: BIO 101 OR BIO 105

BIO 307 BIOCHEMISTRY I: 4 hours

A study of the chemistry of life. Emphasis is placed on the structure and metabolism of carbohydrates, proteins, lipids, nucleic acids, nucleoproteins, vitamins, and minerals. Principles of enzymology are also emphasized. This course has a clinical biochemistry orientation. (Lec. 3, Lab. 2) *(Cross-listed with CHE 307) Prerequisite: CHE 202*

BIO 308 BIOCHEMISTRY II: 4 hours
A continuation of topics discussed in Biochemistry I. Emphasis is placed on the structure and metabolism of complex organic molecules, as well as detailed analysis of mechanisms of gene expression and function. Endocrine regulation of metabolism will also be emphasized. This course is recommended for students planning to apply to Medical School. (Lec. 2, Lab 4) *(Cross-listed with CHE 308)*

BIO 309 GENETICS (CT): 3 hours
An introduction to the principles of classical and modern genetics in microorganisms, plants, and animals. Special attention is placed on human genetics including research and applications. (Lec. 3).
Prerequisites: BIO 104

BIO 310 PARASITOLOGY: 3 hours
A study of the classification, morphology, life cycles, biochemical relationships, etiology, distribution, and health consequences of animal parasites. Emphasis is placed on parasites of man. (Lec. 2, Lab. 2).
Prerequisite: BIO 104

BIO 322 MOLECULAR BIOLOGY: 3 hours
A study of the molecular mechanisms of gene expression and the metabolism of nucleic acids. Topics include transcription, translation, DNA replication, recombination and repair. (Lec. 3)
Prerequisites: BIO 309, CHE 101

BIO 323L MOLECULAR GENETICS LABORATORY: 2 hours
An exploration of modern molecular and genetic laboratory techniques. Students will receive instruction on scientific manuscript preparation. (Lab 4) *Prerequisite: BIO 322 (may be taken concurrently)*

BIO 331 EQUINE DISEASE MANAGEMENT: 3 hours
The students will experience a more complete in-depth study of the equine. The course covers the internal and outer structure of the equine's anatomy. Students will study soundness, conformation, the digestive, respiratory and lymphatic systems. Students will also study the effects of infectious diseases and parasitic conditions. Students will learn about the reproductive system of the equine and discuss potential problems and conditions of the mare in foal as well as the newborn foal. Fee required. *(Cross-listed with EQS 331)*

BIO 333 ANIMAL NUTRITION (CT): 3 hours
Basic and applied farm animal nutritional science; including comparative anatomies of different digestive systems, nutrient requirements, feedstuff types/sources/selection, principles of formulation and practical feeding programs. Judson owned horses may be used for further course expansion and observation. Fee required. *(Cross-listed with EQS 333)*

BIO 400 SEMINAR (CT): 1 hour
Readings, discussion, and/or preparation of technical manuscripts of concepts and problems in the field of biology. *(Cross-listed with EQS 400)*
Prerequisite: BIO 101, senior standing

BIO 401 ORNITHOLOGY: 3 hours
A study of birds with emphasis on field identification, classification, behavior, evolution, morphology, and ecology of birds are important aspects of the course. Field work is required. (Lec. 2, Lab. 2)
Prerequisite: BIO 101, BIO 104, OR approval of the Department Head

BIO 402 MAMMALIAN PHYSIOLOGY: 4 hours
A study of the cellular and molecular physiology of mammalian cells with an emphasis on endocrinology. Topics to be covered will include: membrane potentials, muscle physiology, neurophysiology, cardiovascular physiology, water regulation and kidney function, respiration, hepatic physiology, endocrinology, digestion and energy metabolism. (Lec. 3, Lab. 2)
Prerequisites: BIO 322, CHE 103

BIO 403 DEVELOPMENTAL BIOLOGY: 4 hours
A comparative study of animal development, from invertebrates to humans. Descriptive embryology will be combined with analysis of the molecular and genetic foundations of development. Not open to freshmen. (Lec. 2, Lab. 4)
Prerequisite: BIO 322, CHE 103

BIO 404 COMPARATIVE VERTEBRATE ANATOMY: 4 hours
A study of vertebrate anatomy with emphasis on the evolution and morphology of prechordates and vertebrate classes. Labs are devoted to the dissection of representative vertebrates. Not open to freshmen. (Lec. 2, Lab. 4)
Prerequisite: BIO 104

BIO 405 SCIENCE OUTREACH: 1 hour
A community service program designed to train upper-level science students to host a molecular or environmental science laboratory for high school students. Students will function as a group to organize, prepare, and operate at least one laboratory for a visiting high school group. Students will be graded on their participation and submit a written reflection of their experience. This course mainly serves students preparing for allied health careers and postgraduate work. *(Cross-listed with CHE 405)*
Prerequisite: BIO 101 OR BIO 105, CHE 103, completion of at least 40 semester hours of coursework

BIO 411 SPECIAL STUDIES: 1 to 3 hours
A course for upperclassmen seeking to complete requirements in their major or minor disciplines. Subjects will be taught that do not appear in the College catalog but are of value to a student in her career objectives and/or graduate studies.
Prerequisite: Approval of the Department Head

BIO 412 SPECIAL STUDIES: 1 to 3 hours
A course for upperclassmen seeking to complete requirements in their major or minor disciplines. Subjects will be taught that do not appear in the College catalog but are of value to a student in her career objectives and/or graduate studies.
Prerequisite: Approval of the Department Head

BIO 413 SPECIAL STUDIES: 1 to 3 hours
A course for upperclassmen seeking to complete requirements in their major or minor disciplines. Subjects will be taught that do not appear in the College catalog but are of value to a student in her career objectives and/or graduate studies.
Prerequisite: Approval of the Department Head

BIO 414 SPECIAL STUDIES: 1 to 3 hours
A course for upperclassmen seeking to complete requirements in their major or minor disciplines. Subjects will be taught that do not appear in the College catalog but are of value to a student in her career objectives and/or graduate studies.
Prerequisite: Approval of the Department Head

BIO 416 CELL BIOLOGY (CT): 3 hours
A study of the cell structure and function with attention given to the major classes of organic macromolecules. An organelle approach is taken with emphasis on physiology. Instruction is given on technical writing and a computer generated research paper is required. (Lec. 3)
Prerequisite: BIO 322, CHE 103

BIO 417 IMMUNOLOGY: 3 hours
The study of immunity to infectious disease, including antigen and antibody reactions, cellular immune response, and other human natural defense mechanisms. (Lec. 2, Lab. 2)
Prerequisite: BIO 322, CHE 103

BIO 418 EPIGENETICS: 3 hours
An exploration of functionally relevant changes to the genome that do not involve a change in nucleotide sequences. Topics include environmental factors, gene regulation, chromosome inactivation and other normal and disease causing modifications of the gene functions.
Prerequisite: BIO 322, CHE 103

BIO 420 NEUROSCIENCE: 3 hours
An investigation into the structure and function of the nervous system. Topics discussed include neural development and physiology, cognition, neurological diseases and disorders, and neuroplasticity. (Lec. 3)
Prerequisites: BIO 322, CHE 103

BIO 449, 450 INDEPENDENT STUDIES: 1 to 2 hours
Tutorial courses designed to meet particular needs of the student.
Prerequisite: BIO 101, BIO 104, approval of the Department Head and Academic Dean

BIO 471 INTERNSHIP: 3 hours
Application and one page proposal describing the nature, location, and duration of the desired internship should be submitted to the Department Head at least 3 months in advance. Internship guidelines and procedures stated elsewhere in this Catalog will be followed.
Prerequisite: Approval of the Department Head and Academic Dean

Course Descriptions

MAR 297, **298** **SPECIAL TOPICS**: 2 hours
Prerequisite: Determined by Sea Lab Instructor and listed in the DISL Bulletin.

MAR 303 **GENERAL ECOLOGY**: 4 hours
A study of organisms in their relations to each other and to the environment. Emphasis is placed on basic concepts and principles, natural habitats, and alteration of the environment by man. Students are introduced to major environmental problems, regulating agencies, and conservation organizations. (Lec. 3, Lab. 2) *(Cross-listed with BIO 303)*
Prerequisite: BIO 101, BIO 104 OR BIO 105

MAR 350 **MARINE GEOLOGY**: 4 hours
A study of the geology of the ocean basins, with special emphasis on the continental shelves, their sediments, and the sedimentary processes at work there. (Emphasis on the Northeast Gulf of Mexico)
Prerequisite: Introductory Geology

MAR 355 **MARINE BIOLOGY:** 4 hours
A general survey of marine plants, invertebrates and vertebrates, the communities they form, and the physical and chemical factors which influence their lives.
Prerequisite: BIO 105

MAR 360 **COASTAL ZONE MANAGEMENT:** 2 hours
A review of the ecological features and of management policies for coastal communities with a description of relevant federal and state programs. The course examines the various aspects of coastal zone management in the United States by examining the major substantive and procedural aspects of specific laws and regulations which govern activity in the coastal zone environment and processes; and by examining how coastal environments and processes affect specific management issues of the zone.

MAR 365 **COASTAL GEOMORPHOLOGY:** 2 hours
An introduction to coastal sediment processes and applied coastal geomorphology. Waves and other coastal hydrodynamics, sediment transport, and interaction between natural process and man's activities such as dredging, jetties, and beach fills will be studied.

MAR 370 INTRODUCTION TO OCEANOGRAPHY: 2 hours
A general introduction to the physics, chemistry, geology, and biology of the ocean. The course introduces the student to the interrelationships between physical, geological, chemical and biological processes in the ocean.
Prerequisite: BIO 105

MAR 400 SEMINAR: 1 hour
Readings, discussion, and/or preparation of technical manuscripts of concepts and problems in the field of marine science. Not open to freshmen.
Prerequisite: Marine Science minor with senior standing

MAR 411 SPECIAL STUDIES: 3 hours
A course for upper-classmen seeking to complete requirements in their major or minor disciplines. Subjects will be taught that do not appear in the College catalog but are of value to a student in her career objectives and/or graduate studies.
Prerequisite: Approval of the Department Head

MAR 412 SPECIAL STUDIES: 3 hours
A course for upper-classmen seeking to complete requirements in their major or minor disciplines. Subjects will be taught that do not appear in the College catalog but are of value to a student in her career objectives and/or graduate studies.
Prerequisite: Approval of the Department Head

MAR 413 SPECIAL STUDIES: 3 hours
A course for upper-classmen seeking to complete requirements in their major or minor disciplines. Subjects will be taught that do not appear in the College catalog but are of value to a student in her career objectives and/or graduate studies.
Prerequisite: Approval of the Department Head

MAR 414 SPECIAL STUDIES: 3 hours
A course for upper-classmen seeking to complete requirements in their major or minor disciplines. Subjects will be taught that do not appear in the College catalog but are of value to a student in her career objectives and/or graduate studies. *Prerequisite: Approval of the Department Head*

MAR 420 MARINE BOTANY: 4 hours
A general survey of marine algae (microscopic and macroscopic), as well as salt marsh vegetation, mangroves, seagrasses and maritime forest communities. Identification, distribution, structure, ecology, and physiology will be emphasized.
Prerequisite: BIO 105

MAR 422 MARINE VERTEBRATE ZOOLOGY: 4 hours
A survey of marine fishes, reptiles and mammals, and an in-depth, comprehensive treatment of their systematics, zoogeography, and ecology. The vertebrate fauna of the northern Gulf of Mexico will be stressed.

MAR 424 MARINE INVERTEBRATE ZOOLOGY: 4 hours
This course surveys the morphology, natural history and evolutionary relationships of the marine invertebrates.

MAR 426 MARINE ECOLOGY: 4 hours
Students will study marine organisms as they interact with each other and their environment, and examine theories and the experimental basis of our current knowledge. Students will study factors influencing population dynamics, community structure, and energy flow in marine ecosystems.
Prerequisite: BIO 101, BIO 105, CHE 103 (MAT/BUS 231 are recommended)

MAR 428 MARSH ECOLOGY: 4 hours
This is a study of the floral and faunal elements of various coastal and near-coastal marsh communities and the interaction with the environment. The course will focus upon the main indicators of marsh wetlands (vegetation, soil and hydrology), how they interact to form functional wetlands, and how these wetlands are linked to the estuaries and seas beyond.
Prerequisite: BIO 105, CHE 103 (BUS/MAT 231 is recommended)

MAR 497, **498 SPECIAL TOPICS:** 3 hours
Subjects may be taught that are of value to the student in her career objectives and/or graduate studies.