Curriculum for BS in Biology - West Virginia State University
(As of Feb. 18, 2016)

PRINCIPLES OF BIOLOGY (4 credit hours)

An introduction to the nature of science through a study of selected principles which characterize the nature of life. Does not count toward a major in Biology. Three lecture and two laboratory hours per week.

ENVIRONMENTAL BIOLOGY (3 credit hours)

A comprehensive, issues based examination of the Earth's environment, and humanity's impact on it. Students will complete a group project on a topic in environmental biology, a laboratory experience consisting of a series of independent problems in environmental biology, keep a journal, in addition to mastering the standard lecture material. Local field trips may also be required. Does not count toward a major in Biology. Two lecture and two laboratory hours per week.

ECONOMIC BIOLOGY (4 credit hours)

Economic Biology will describe how numerous organisms have influenced our past and will change our future. It will cover the basic principles of biology while emphasizing the economic and social aspects of selected plants, microbes, fungi and animals. A special recitation session devoted to studying science will be scheduled to support those who may have "science phobias". Fulfills the General Education Natural Sciences requirement but not a Biology majors' core requirement. Five contact hours per week.

FUNDAMENTALS OF BIOLOGY (4 credit hours)

An in-depth introductory study of the biological sciences for science majors, emphasizing major principles of biology and the nature of scientific research. Students will conduct an original research experiment during the semester. Counts as General Education Natural Science requirement and General Education Computer Skills unit. Must be eligible for ENGL 101. Three lecture and two laboratory hours per week.

BIOLOGICAL DIVERSITY (4 credit hours)

An introduction to the branches of the tree of life for science majors. An emphasis on study of the identification, structure and function of living organisms. Three lecture hours and three laboratory hours per week. Prerequisite: BIOL 120

SPECIAL TOPICS (1 - 4 CREDIT HOURS)

A freshman level course designed for a topic of special or current interest, including televised courses. Prerequisites: as stated for each course.

BASIC ANATOMY AND PHYSIOLOGY (4 credit hours)

A basic systemic approach to the study of human anatomy and physiology. Laboratory experiences integrated with lecture enable students to examine anatomical and physiological phenomena of the human body. Does not count toward a major in Biology.

INTRODUCTION TO MICROBIOLOGY (4 credit hours)

An introduction to microbial diversity, medical and applied microbiology, and immunology. The laboratory includes basic techniques for handling and identifying microbes such as those required by health care professionals. Does not count toward a major in Biology. Prerequisites: BIOL 101 or 120.

GENERAL ECOLOGY (4 credit hours)

General Ecology covers the full spectrum of relationships between organisms and their biotic and abiotic environments, emphasizing the principles of natural selection, adaptation and evolution. Lab component is comprised of field and laboratory experiments demonstrating fundamental concepts of ecology from the level of the individual to the ecosystem. Six class hours per week. Prerequisites: BIOL 120 and 121; eligibility for MATH 101 or 121.

GENETICS (4 credit hours)

The nature, biosynthesis and regulation of the genetic material in prokaryotic and eukaryotic organisms. Mendelian principles, and introduction to population and quantitative genetics, and an introduction to recombinant DNA and genomics will be included. Laboratory investigation of selected phenomena. Prerequisites: BIOL 120 and 121; CHEM 106 and 108.

SPECIAL TOPICS (1 - 4 CREDIT HOURS)

A sophomore level course designed for a topic of special or current interest, including televised courses. Prerequisites: as stated for each course.

NUTRITION (3 credit hours)

Consideration of nutrient classification and functions and the relationship of nutritional status to health. Application of nutritional requirements to food patterns. Does not count toward a major in Biology.

GENERAL ZOOLOGY (4 credit hours)

This course examines major concepts of zoology at the organismal and organ function levels, and provides the student with an introduction to recent advances in zoology in the areas of animal anatomy, physiology, systematics, reproduction, development, animal diversity, animal ecology, and evolution of major taxa of the animal kingdom.

Prerequisite: BIOL 121.

CONSERVATION ECOLOGY (3 credit hours)

This course reviews the evolutionary and ecological bases for the Earth's biodiversity and its importance to ecosystem function and human welfare. The causes, rates and patterns of loss of biodiversity throughout the world and the concepts and techniques used in ecological conservation and restoration are reviewed. Three class hours per week. Prerequisite: BIOL 250 or permission of the instructor.

ENTOMOLOGY (4 credit hours)

The taxonomy, anatomy, life history, and measures of control of some of the common insects. Emphasis is placed on field studies. Six class hours per week. Prerequisite: BIOL 250.

ANIMAL PARASITISM (4 credit hours)

This course details the ecological concept of parasitism, utilizing the prominent parasitic species of animals and man. The laboratory component of the course concerns the identification of species and structures of the important parasites of animals and man. Lab and field projects dealing with natural and host-parasite systems will also be undertaken. Six class hours per week. Prerequisite: BIOL 121.

INVERTEBRATE ZOOLOGY (4 credit hours)

The taxonomy, anatomy, and life history of selected invertebrate groups. Six class hours per week, including laboratory. Prerequisite: BIOL 121.

VERTEBRATE ZOOLOGY (4 credit hours)

A study of vertebrate animals, with emphasis on their evolution, systematics, ecology, and behavior. Six class hours per week, including laboratory. Prerequisite: BIOL 121

VERTEBRATE HISTOLOGY (4 credit hours)

Microscopical study in detail of the structures, tissues and organs of vertebrate animals and a correlation of these structures with function. Six class hours per week. Prerequisite: BIOL 121

HUMAN ANATOMY AND PHYSIOLOGY I (4 credit hours)

An in-depth systemic approach to the study of the human body emphasizing organizational structure, osteology, myology, lymphology, and the cardiovascular system. Prerequisite: BIOL 101 or BIOL 120

HUMAN ANATOMY AND PHYSIOLOGY II (4 credit hours)

An in-depth systemic approach to the study of the human body emphasizing the nervous, endocrine, respiratory, digestive, urinary and reproductive systems. Prerequisite: BIOL 331.

MICROBIOLOGY (4 credit hours)

Fundamentals of microbiology, including genetics, physiology, diversity, ecology. growth, and control of microorganisms. Medical, industrial and environmental importance of microorganisms. Laboratory includes an introduction to basic microbiology methods, emphasizing bacteria. BIOL 121, CHEM 105 and 107.

GENERAL VIROLOGY (3 credit hours)

A consideration of selected prokaryote and eukaryote viruses, their structure, replication and interaction with host cells. Attention will be given to the contributions virology has made to the understanding of molecular mechanisms in Biology. Prerequisite: BIOL 270.

IMMUNOLOGY (4 credit hours)

The basic mechanisms of resistance in host-parasite interactions with emphasis on the molecular basis of immune system functions. Prerequisite: Permission of the instructor.

EVOLUTION (3 credit hours)

A course covering the concepts and theories of modern evolutionary biology, including the mechanisms of genetic change in populations, speciation patterns, and geologic change through time. Three class hours per week. Prerequisites: BIOL 250 or 270.

MICROBIAL GENETICS (4 credit hours)

Genetic mechanisms of bacteria, including their viruses, plasmids and transposons. Integration of genetic principles and genetic/molecular tools for understanding biological questions. Select topics in eukaryotic microbial genetics will be included. Six class hours per week including laboratory. Prerequisites: CHEM 106; BIOL 341 and 270.

THE BIOLOGY OF FISHES (4 credit hours)

This is an introductory course that examines the evolution, morphology, anatomy, physiology, and ecology of fishes. The course will relate the above subject areas to aquaculture principles and practices. Six class hours per week. Prerequisites: BIOL 121.

PHARMACOLOGY (4 credit hours)

An introduction to the basic pharmacological principles of drug administration, pharmacokinetics, and pharmacodynamics. The therapeutic application of clinically useful drugs is emphasized including appropriate drug selection, toxicities, drug interactions, and side effects. Prerequisites: BIOL 101 or BIOL 120; CHEM 101 and CHEM 201, or CHEM 105 and CHEM 106; or permission of the instructor.

PRINCIPLES OF AQUACULTURE (4 credit hours)

An in-depth step-by step study of the principles and practices underlying commercial aquaculture production, aquatic productivity and the levels of aquaculture management. Practices in the United States will be the primary focus with attention to the world in general. Six class hours per week. Prerequisites: BIOL 250.

CELL BIOLOGY (4 credit hours)

The cellular basis for the functional attributes of living systems, laboratory investigation of selected physiological phenomena. Four credits, six class hours per week. Prerequisites: BIOL 270; CHEM 201; or CHEM 206 and 208.

PRACTICUM IN BIOLOGY (1 credit hour)

Experience in the preparation of materials and equipment for biology laboratory investigations and experience in practical instruction in the biology laboratory. Open only to Biology majors. May be repeated for a maximum of four hours credit. Counts only as a free elective toward a major in the Department of Biology. Four clock hours per week. Prerequisite: Junior standing and permission of the instructor and the department chair.

SPECIAL TOPICS (1 - 4 CREDIT HOURS)

A junior level course designed for a topic of special or current interest, including televised courses. Prerequisites: as stated for each course.

SENIOR SEMINAR (1 credit hour)

A research experience involving literature search, experimental design, written and oral presentation of project. Prerequisite: BIOL 385.

EMBRYOLOGY AND ANIMAL DEVELOPMENT (4 credit hours)

A study of the patterns and processes of animal development at the embryonic, cellular, and subcellular levels. Six class hours per week, including laboratory. Prerequisites: BIOL 385 or permission of the instructor.

COMPARATIVE VERTEBRATE MORPHOLOGY (4 credit hours)

A comparative study of the basic architectural plans of the vertebrate body, emphasizing the function and evolution of major organ systems. Six class hours per week, including laboratory. Prerequisites: permission of instructor.

FIELD BOTANY (4 credit hours)

An integrated laboratory study of the taxonomy, ecology and geography of plants with emphasis on the flora of West Virginia. Six class hours per week. Prerequisite: BIOL 250 or permission of instructor.

PLANT DEVELOPMENT (4 credit hours)

A detailed study of the role of developmental processes in the evolution, ecology, and domestication of plants, emphasizing the production of morphological diversity in extant and extinct taxa. Six class hours per week including laboratory. Prerequisites: BIOL 250 and 270 or permission of instructor.

PLANT GEOGRAPHY (3 credit hours)

Descriptive and interpretative plant geology, including a survey of the present distributions of major vegetational formations, discussion of the history, development, evolution and significance of their patterns, climatic regions, and composition of the major plant formations. Prerequisite: BIOL 250 or permission of instructor.

PLANT TISSUE CULTURE (4 credit hours)

The principles and techniques of culturing plant tissues in vitro for research and horticultural applications. Six class hours per week. Prerequisite: BIOL 250 or permission of instructor.

PLANT PHYSIOLOGY (4 credit hours)

This course includes an analysis of the cell biology, biochemistry, metabolism, ecological physiology, and development of plants. Lecture topics include water relations, respiration, photosynthesis, nitrogen fixation, mineral nutrition, plant hormones, plant molecular biology, genetic engineering, and the role of environmental signals in plant development, and the environmental physiology of Mid-Atlantic, mixed mesophytic, deciduous forests. Lectures will be supplemented with reading in research journals. Laboratory exercises are designed to demonstrate basic research techniques as well as the principles covered in lecture. Six contact hours per week. Prerequisites: BIOL 120, CHEM 106 and 108, CHEM 205 and 207.

ENVIRONMENTAL MICROBIOLOGY (4 credit hours)

Microbial functions, interactions, and diversity in natural and man-made environments. Applications of microbial activities in bioremediation, biodegradation, agriculture, health and environmental biotechnology. Six class hours per week, including laboratory. Prerequisites: BIOL 341; CHEM 106 and 108 or permission of instructor.

CANCER BIOLOGY (3 credit hours)

This course will introduce the student to the biology of tumors. Emphasis will be placed on the cellular and molecular events that lead to tumor formation and progression to cancer. The course format will be a combination of traditional lecture and seminar. Three class hours per week. Prerequisites: BIOL 385 or permission of the instructor.

DIRECTED STUDENT RESEARCH (1 - 4 credit hours)

An independent research topic designed by the student with the assistance of the instructor, and acceptable to the instructor and the chair. Variable contact hours. A maximum of 4 credits of BIOL 490 may be counted toward a Biology major. Prerequisite: 24 hours of Biology plus permission of chair and instructor.

UNDERGRADUATE INDEPENDENT STUDY OR RESEARCH (1 - 4 credit hours)

A continuing independent research topic designed by the student with the assistance of the instructor, and acceptable to the instructor and the chair. Available after fulfilling 4 credits hours of BIOL 490. Course is graded pass / fail only. Prerequisite: permission of chair and instructor.

UNDERGRADUATE LIBRARY RESEARCH (1 - 2 credit hours)

An introduction to library research techniques and to the biological literature. Staff assigns a topic and supervises the project. A maximum of 2 credits of BIOL 492 may be counted toward a Biology major. Prerequisite: permission of chair and instructor.

SPECIAL TOPICS IN BIOLOGY (1 - 4 credit hours)

An in-depth study of special topics proposed by members of the biology faculty. May be repeated for a maximum of eight credit hours. Counts only as a free elective toward a major in the Department of Biology. Variable contact hours. Prerequisites: Junior standing and permission of the instructor and the department chairperson.