

VERNON COLLEGE
SYLLABUS

DIVISION: Mathematics and Science

DATE: 2020-2021

COURSE NUMBER AND TITLE: BIOL 1411 GENERAL BOTANY

CREDIT HRS: 4 HRS/WK LEC: 3 HRS/WK LAB: 2 LEC/LAB COMB: 5

I. VERNON COLLEGE CORE CURRICULUM PHILOSOPHY STATEMENT

Vernon College's Core Curriculum reflects the institution's deep conviction that successful, satisfying lives require a wide range of skills and knowledge. We are dedicated to providing educational opportunities that develop the academic, career, and personal capabilities of individuals so they may achieve self-fulfillment and participate fully and positively in a democratic society. In accordance with Texas Education Code, Vernon College offers a 42 semester credit hour Core Curriculum. The State of Texas has identified Foundational Component Areas and Core Objectives that enable students to gain a foundation of knowledge of human cultures and the physical and natural world, develop principles of personal and social responsibility for living in a diverse world, and advance intellectual and practical skills that are essential for all learning.

CORE CURRICULUM FOUNDATIONAL COMPONENT AREA

Life and Physical Sciences

- Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method.
- Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.
- The following four Core Objectives must be addressed in each course approved to fulfill this category requirement: Critical Thinking Skills, Communication Skills, Empirical and Quantitative Skills, and Teamwork.

CORE OBJECTIVES*

- A. Critical Thinking: Students will demonstrate creative thinking, recognize innovation, practice inquiry, perform analysis, and evaluate and synthesize information.**
- B. Communication Skills: Students will effectively develop, interpret, and express ideas through written, oral, and visual communication.**
- C. Empirical and Quantitative Skills: Students will manipulate and analyze numerical data or observable facts resulting from informed conclusions.**
- D. Teamwork: Students will develop abilities to consider different points of view and to work effectively with others to support a shared purpose or goal.**
- E. Personal Responsibility: Students will demonstrate an ability to recognize and connect choices, actions, and consequences to ethical decision making.
- F. Social Responsibility: Students will develop intercultural competency, civic knowledge, and an ability to engage effectively in regional, national, and global communities.

*Core competencies highlighted in bold are emphasized in this core course.

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II. CATALOG DESCRIPTION:

Prerequisite: Successful completion of MATH 1314 or equivalent is recommended. Fundamental biological concepts relevant to plant physiology, life cycle, growth and development, structure and function, and cellular and molecular metabolism. The role of plants in the environment, evolution, and phylogeny of major plant groups, algae, and fungi. Laboratory activities will reinforce these concepts. (This course is intended for science majors.) Lab Fee: \$24.00; Special Fee: \$12.00

III. REQUIRED BACKGROUND:

Prerequisite: Texas Success Initiative complete in Reading and Writing. MATH1314/1414 College Algebra is recommended

IV. STUDENT E-MAIL:

All students should activate and regularly check their Vernon College issued student email account. Student emails are an official form of communication between Vernon College and students and will be used by various components of the college including the Office of Financial Aid, Admissions & records, the Business Office, Student Services, and Instructional Services.

Additionally, an active VC student email account is required for students to access online courses and supplemental instruction provided on the College's Learning Management System – *Canvas*.

V. TEXTS, OTHER REQUIRED MATERIALS:

Textbook: Mauseth, James D., *Botany: An Introduction to Plant Biology*, 5th Edition, Jones & Bartlett Publishers, 2014.

Lab Book:

Pfluger, Stacy, *Botany: A Lab Manual*; 2014.

V. METHODS OF INSTRUCTION:

1. The primary instructional method used in this course use a combination of the traditional lecture-discussion method, audio-tutorial approach and internet based work are used to cover some topics. Lecture and/or reading of text and notes available online, discussions and/or papers on relevant or controversial subjects are used. Audio-visual and interactive aids are used in the lecture and online formats.
2. At times lecture and laboratory will be integrated to provide a more practical experience. Laboratory sessions are also required each week with emphasis placed on selected laboratory exercises to reinforce the learning process. Students will be expected to collaborate as a team.

Students desiring auxiliary aids and services for this course should make their requests to the instructor and the PASS Department Director/Office for Students with Disabilities Coordinator.

VI. COURSE CONTENT:

Chapter 1 Introduction to Plants and Botany
Chapter 2 Introduction to the Principles of Chemistry
Part 1 Plant Structure
Chapter 3 Cell Structure

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- Chapter 4 Growth and Division of the Cell
- Chapter 5 Tissues and the Primary Growth of Stems
- Chapter 6 Leaves
- Chapter 7 Roots
- Chapter 8 Structure of Woody Plants
- Chapter 9 Flowers and Reproduction
- Part 2 Plant Physiology and Development
 - Chapter 10 Energy Metabolism: Photosynthesis
 - Chapter 11 Energy Metabolism: Respiration
 - Chapter 12 Transport Processes
 - Chapter 13 Soils and Mineral Nutrition
 - Chapter 14 Development and Morphogenesis
 - Chapter 15 Genes and the Genetic Basis of Metabolism and Development
- Part 3 Genetics and Evolution
 - Chapter 16 Genetics
 - Chapter 17 Population Genetics and Evolution
 - Chapter 18 Classification and Systematics
 - Chapter 19 Algae and the Origin of Eukaryotic Cells
 - Chapter 20 Nonvascular Plants: Mosses, Liverworts, and Hornworts
 - Chapter 21 Vascular Plants Without Seeds
 - Chapter 22 Seed Plants I: Gymnosperms
 - Chapter 23 Seed Plants II: Angiosperms
 - Chapter 24 Fungi
 - Chapter 25 Prokaryotes: Domains Bacteria and Archaea
- Part 4 Ecology
 - Chapter 26 Populations and Ecosystems
 - Chapter 27 Biomes

VII. COURSE OUTCOMES:

Upon successful completion of the course, students will be able to:

1. Compare and contrast the structures, reproduction, and characteristics of plants, algae, and fungi.
2. Describe the characteristics of life and the basic properties of substances needed for life.
3. Identify the principles of inheritance and solve classical genetic problems.
4. Describe phylogenetic relationships and classification schemes.
5. Identify the major phyla of life with an emphasis on plants, including the basis for classification, structural and physiological adaptations, evolutionary history, and ecological significance.
6. Identify the chemical structures, synthesis, and regulation of nucleic acids and proteins.
7. Identify the substrates, products, and important chemical pathways in photosynthesis and respiration.
8. Describe the unity and diversity of plants and the evidence for evolution through natural selection.
9. Compare different sexual and asexual life cycles noting their adaptive advantages.
10. Describe the reasoning processes applied to scientific investigations and thinking.
11. Apply scientific reasoning to investigate questions and utilize scientific tools such as microscopes and laboratory equipment to collect and analyze data.

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12. Use critical thinking and scientific problem-solving to make informed decisions in the laboratory.
13. Work effectively with others as members of a team in the laboratory setting.
14. Communicate effectively the results of scientific investigations.

VIII. ASSESSMENT:

Course Outcomes are evaluated in both lecture and laboratory settings. Evaluation will be based on testing, classroom or internet participation, evidence of preparation, presentations, attendance, or any combination of the above. Students are also required to prepare a project requiring use of the library and their writing skills.

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Vernon College does not discriminate on the basis of color, race, gender, age, religion, national origin, or disability.