

Coffeyville Community College

BIOL-202
COURSE SYLLABUS
FOR
GENERAL BOTANY

Pam Oliver
Instructor

COURSE NUMBER:	BIOL-202	COURSE TITLE:	General Botany
CREDIT HOURS:	5		
INSTRUCTOR:	Pam Oliver		
OFFICE LOCATION:	North side, second floor Arts and Sciences Building		
OFFICE HOURS:	See schedule posted on door		
OFFICE PHONE:	620-251-7700 ext. 2070		
E-MAIL:	pamo@coffeyville.edu		
PREREQUISITE(S):	None; <i>General Biology or at least 2 years of HS Advanced Biology</i>		
REQUIRED TEXT AND MATERIALS:	<p><i>Introductory Plant Biology</i> by Stern, Bidlack, and Jansky <i>Introductory Plant Biology Laboratory Manual.</i> <i>Colored pencils</i></p>		
CLASSROOM RULES:	<p>Students are expected to follow ordinary rules of courtesy during class sessions. Some of the general rules of classroom etiquette are below.</p> <ol style="list-style-type: none"> 1. Do not talk to others in class while the instructor is lecturing. If you have a question, ASK THE INSTRUCTOR! 2. Keep hands, objects, and NEGATIVE COMMENTS to yourself. 3. Tardiness and early departure are distracting to your fellow classmates, and can negatively impact your grade. 4. Head/ear phones will NOT be permitted in class. 5. No Cell Phones will be used during class. This includes TEXT MESSAGING. 6. The instructor will dismiss class. Do not begin putting your “stuff” away until you are excused; if you do- a Pop quiz will be given. <p>Consequences of disruptive behavior:</p> <ul style="list-style-type: none"> ◆ Removed from class for the day. Student must meet with instructor to discuss behavior before allowed back into class. ◆ Activity sponsor/Coach will be contacted. ◆ Removed from class for the semester. ◆ Receive a failing grade in the class. ◆ Receive a zero on the test or assignment. 		
COURSE DESCRIPTION:	<p>The course includes the structure and function of plants, plus the biological principles of evolution, heredity, environmental and geographical distribution. Special reference will be given to those phases of plant life with are of economic importance.</p>		

Who Should Take This Course? This course is designed for science majors. Majors from other disciplines are welcome, but should be advised that it is assumed that anyone who enrolls in this course already has some understanding of biology from a college-level introductory biology course or a HS advanced biology class.

EXPECTED LEARNER

OUTCOMES:

Upon completion of this course, the student will be able to describe, identify and demonstrate an understanding of :

1. The nature of science and life
2. The chemistry of life, including basic and organic
3. Cell composition and function including membrane structure and function
4. Morphology and function of Plant Tissues .
5. The morphology, function, and relationships of stems, roots, leaves, flowers, fruits, and seeds
6. Bioenergetics including metabolism, energy, and enzymes and photosynthesis, and cellular respiration
7. Maintaining continuity of life in plants, including mitosis, meiosis, alternation of generations and plant life cycles
8. Understand the principals of Mendelian Inheritance and molecular genetics
9. Taxonomic Classification and identification of Plants
10. Uniqueness, Diversity and Importance of Fungi, Bryophytes, Seedless Vascular Plants, Gymnosperms, Angiosperms
11. Importance of plants in the ecosystem

LEARNING TASKS

& ACTIVITIES:

Lecture class will normally consist of traditional lecture using power-point and note-taking. Bring your textbook, handouts, paper, pencil or pen, and a highlighter to class.

Laboratory class: following a brief introduction by the instructor, students will work independently to complete the lab activity assigned.

1. Laboratory Activities from the lab book and handouts
2. Videos
3. Library Research
4. Group Discussion
5. Projects and Presentations

Students should bring their lab book, textbook and colored pencils to lab.

ASSESSMENT OF

OUTCOMES:

Grades will be based on total points earned divided by points possible. The grading scale in this course is A (100-90%), B (89-80%), C (79-70%), D (69-60%), F (59-0%).

Incompletes given at the end of the course will only be given if previously agreed upon by the student and instructor. Please note the college's policy on incompletes as stated in the college catalog.

**ABSOLUTELY NO
EXTRA CREDIT IS
GIVEN IN THIS
CLASS!**

The student's final grade will be based on the following:
5-6 lecture tests @ 100 points..... 500-600 points
3 or 4 lab tests @ 100 points..... 300-400 points
Laboratory assignments150 points
Presentation & Paper.....100 points
Attendance, Participation, Assignments, Quizzes 100 points

- ◆ **Attendance/Participation points and pop quizzes cannot be made up!**
- ◆ **Lecture tests can be made up only with the approval of the instructor and only if arrangement with the instructor is made within 24 hours of the scheduled exam.**
- ◆ **The test must be made up within a week of the absence (if excused).**
- ◆ **Laboratories and LAB EXAMS CANNOT BE MADE UP!**
- ◆ **Late assignments will be docked 10% per day.**

ATTENDANCE POLICY:

Students are expected to attend all classes. Regular class attendance is necessary for maximum success in college. It is the responsibility of students to make definite arrangements for all work before going on field trips or other College-sponsored trips. School-sponsored activities will be counted as excused absences provided students complete all necessary assignments as designated by the instructors and the activity sponsors notify the instructors at least three (3) days prior to the day(s) the students will be absent. A student may be withdrawn from any class for excessive absences or non-participation. Non-participatory behavior (such as sleeping or text messaging) during lecture will be treated as an absence. Three tardies will equal one absence.

If a student misses twice the number of credit hours of a class, or has been non-participatory in a mediated course, and is achieving a below average grade, the instructor may request that the student be withdrawn from the class for non-attendance/non-participation.

ACADEMIC INTEGRITY:

Academic Dishonesty of any kind on will render the offender liable to serious consequences such as a zero and possibly suspension from the class. The following are examples:

1. Illegal possession of the exam
2. Use of unauthorized notes during an exam
3. Obtaining information from the book, notes, or others during an exam
4. Assisting others to cheat
5. Alteration of grade records
6. Illegal entry or unauthorized entry into office
7. Offering the work of another as one's own

**STUDENT'S
RESPONSIBILITY:**

- ◆ **Students must earn their grade. Just attending class will not allow students to earn the points necessary to pass the course. Students must do the work.**
- ◆ **It is the student's responsibility to attend class, take notes, participate in class, turn in assignments on time, etc.**
- ◆ **It is the responsibility of the student to read assigned materials**
- ◆ **If class is missed for any reason, the student is responsible for obtaining all content covered any announcements made in his/her absence.**
- ◆ **It is the student's responsibility to communicate with the instructor about problems in the class, and to seek out help if needed.**

This syllabus is subject to revision with prior notification to the student.

**COURSE
OUTLINE:**

Botany Course Outline

WEEK	TOPIC	TEXT	LABORATORY
1	Importance of botany Atoms and molecules Nature of life	Ch. 1 & 2	Lab 0: Introduction Lab 1: Microscope
2	Cells The Cell Cycle	Ch. 3	Lab 2: The Cell Lab 3: Mitosis
3	Lecture Exam #1 Tissues	Ch. 4	Lab 3 continued
4	Roots and Soils Lecture Exam #2	Ch. 5	Lab Practical #1 Lab 4: Roots
5	Stems and Leaves	Ch. 6 Ch. 7	Lab 5: Stems
6	Flowers, Fruits, and Seeds Lecture Exam #3	Ch. 8	Lab 6: Leaves
7	Water in plants	Ch. 9	Lab Practical #2 Lab 9: Diffusion, Growth, and Hormones
8	Plant metabolism Lecture Exam #4	Ch. 10	Lab 10: Photosynthesis
9	Spring Break		
10	Growth	Ch.11	Lab 11: Respiration
11	Meiosis	Ch. 12	Lab 12: Meiosis
12	Genetics Lecture Exam #5	Ch. 13	Lab 21: Genetics Lab Practical #3
13	Plant Names and Classification Kingdom Bacteria, Kingdom Archaea and Viruses	Ch.16 & 17	Lab 13: Classification Lab 14: Kingdom Survey
14	Kingdom Protista: Algae Kingdom Fungi	Ch. 18 & 19	Lab 15: Fungi
15	Plant Kingdom: Bryophytes Seedless Vascular Plants	Ch. 20 Ch. 21	Lab 16: Bryophytes and Ferns Lab 17: Gymnosperms
16	Gymnosperms Angiosperms	Ch. 22 & 23	Lab 18: Angiosperms Final Lab Practical # 4
17	Lecture Exam # 6 (FINAL)		

COMPETENCIES: Upon completion of this course, the following should be accomplished by the student.

WHAT IS PLANT BIOLOGY? 1

Understand how humans have impacted their environment, particularly during the past century.
Describe how hypotheses are formulated and used in the scientific method
Explain how and why all life is dependent on green organisms
Explain oxidation reduction Be able to indicate briefly the particular aspects of botany with which each of the major botanical disciplines is concerned.

THE NATURE OF LIFE 2

Learn the attributes of living organisms
Define matter, describe its basic state
Understand the nature of compounds and describe acids, bases, and salts
Know the various forms of energy
Learn the elements found in cells
Understand the nature of carbohydrates, lipids and proteins

CELLS 3

Trace the development of modern cell theory and show how early researchers have led us to our current understanding
Explain the unique structure of plant cells and how communication between and within cells occurs.
Know the following cell structures and organelles and indicate the function of each: plasma membrane, nucleus, endoplasmic reticulum, ribosomes, dictyosomes, plastids, mitochondria, microbodies, vacuoles, and cytoskeleton
Describe how information contained in the nucleus relates to the other parts of the cell
Understand the cell cycle and the events that take place in each phase of mitosis

TISSUES 4

Know the meristems present in plants and where they are found.
Learn the conducting tissues of plants and the function of each cell component
Learn tissue of plants that are neither meristematic nor function in conduction at maturity

ROOTS AND SOILS 5

Know some primary functions and forms of roots.
Learn the root regions, including the root cap, region of cell division, region of cell elongation, and region of maturation (including root hairs and all tissues), and know the function of each.
Discuss the specific functions of the endodermis and the pericycle.
Understand the differences among the various types of specialized roots.
Know at least 10 practical human uses of roots
Understand how a good agricultural soil is developed from raw materials
Contrast the various forms of soil particles and soil water with regard to specific location and availability to plants.

STEMS 6

Know the tissues that develop from shoot apices and the meristems from which each tissue is derived. Distinguish between primary tissues and secondary tissues.
Learn and give the function of each of the following: vascular cambium; cork cambium; stomata; lenticels
Contrast the stems of herbaceous and woody dicots with the stems of monocots
Understand the composition of wood and its annual rings, sapwood, heartwood, and bark. Explain how a log is sawed for commercial use.
Distinguish among rhizomes, stolons, tubers, bulbs, corms, cladophylls, and tendrils.
Learn at least 10 human uses of wood and stems in general.

LEAVES 7

Learn the external forms and parts of leaves. Know the functions of a typical leaf and the specific tissues and cells that contribute to those functions.
Understand the differences among pinnate, palmate, and dichotomous venation and also the differences between simple and compound leaves.
Contrast tendrils, spines, storage leaves, flower-pot leaves, window leaves, reproductive leaves, floral leaves, and

different types of insect trapping leaves.

Explain why deciduous leaves turn various colors in the fall and how such leaves are shed.

Know at least 15 uses of leaves by humans.

FLOWERS, FRUITS, AND SEEDS 8

Know the parts of a typical flower and the function of each part.

Learn the features that distinguish monocots from dicots.

Understand the distinction between a fruit and a vegetable.

Know the regions of mature fruits

Learn 5 types of fleshy and dry fruits and know how simple, aggregate, and multiple fruits are derived from the flowers.

Learn the adaptations of fruits and seeds to the agents by which they are dispersed.

Diagram and label a mature dicot seed (bean) and a monocot seed (corn_ in section to show the parts and regions)

Understand the changes that occur when a seed germinates and note the environmental conditions essential to germination

Know the types of factors that control dormancy. Learn how dormancy may be broken both naturally and artificially.

WATER IN PLANTS 9

In simple terms, explain diffusion, osmosis, turgor, imbibition, and active transport.

Discuss the pressure flow hypothesis and the cohesion-tension theory.

Know the pathway, movement and utilization of water in plants.

Explain how a stomatal apparatus opens and closes the pore

Know and understand mineral requirements for growth.

PLANT METABOLISM 10

Contrast the generalized equations of photosynthesis and respiration.

Understand what occurs in the light-dependent and light-independent reactions of photosynthesis and know the principal products of the reactions.

Explain what occurs in glycolysis, citric acid cycle, and electron transport during respiration.

Distinguish between aerobic respiration and fermentation

Compare assimilation and digestion.

GROWTH 11

Contrast growth, differentiation, and development and distinguish among nutrients, vitamins and plant hormones

Identify the types of plant hormones and describe the major functions of each; discuss commercial applications for each.

Distinguish among the various types of plant movements and identify the forces behind them.

Define photoperiodism and make distinctions among short day, long-day, intermediate-day, and day-neutral plants

Explain what phytochrome is and how it functions

Summarize or outline the role of temperature in plant growth

Describe dormancy and stratification and give examples

MEIOSIS AND ALTERNATION OF GENERATIONS 12

Know the phases of meiosis and briefly describe what occurs in each of them

Understand clearly what features meiosis and mitosis have in common and how they differ.

Explain the significance of crossing over in offspring

In Alternation of Generations, indicate at what point each of the following occurs; a change from n to $2n$; a change from $2n$ to n ; initiation of the gametophyte generation

Relate meiosis and Alternation of generations to the process of DNA replication.

GENETICS 13

Identify components of DNA molecule and know how they are arranged in the molecule

Describe the functions of DNA

Describe how a DNA molecule replicates

Know the function of transcription and outline its steps

Know the function of translation and outline its steps

Distinguish between somatic and germ-line mutations

Describe the significance of translocations and inversions

Distinguish between aneuploids and polyploids

Understand the significance of Mendel's experiments with peas

Give ratios of monohybrid and dihybrid crosses
Distinguish between genotypes, phenotype, heterozygous, homozygous
Be able to solve simple genetic problems
Show how genes may interact to affect phenotype
Explain how genotype influences phenotype
Describe quantitative traits
Describe extranuclear DNA
Explain linkage
Describe Hardy Weinberg law

PLANT BREEDING AND PROPAGATION (14)

Provide explanations for the shift from hunter-gatherer society to agricultural ones
Describe phenotypic changes that occurred in plant populations as a result of human selection
Describe breeding methods used for self-pollinating crops
Describe breeding methods for cross-pollinating crops
Explain the significance of germplasm banks to crop improvement programs
Describe the method used to produce protoplast fusion hybrids
Outline the major steps involved in creating a transgenic plant
Outline the steps involved in growing a crop from seed
Describe how cutting propagation methods produce genetically identical plants
Explain the benefits of grafting and outline the steps involved in making a graft
Provide examples of specialized roots and stems used for asexual propagation
Explain the benefits of micropropagation and outline the steps involved in micropropagation.

KINGDOM FUNGI (19)

Know some general features
Distinguish phyla and subphyla
Learn the form and function of sporangium, conidium, coenocytic, mycelium, dikaryotic, zygospore, ascus, and basidium
Know characteristics and classification of athlete's foot, Dutch elm disease, bilobolus, Penicillium mold, stinkhorn, yeast, ergot, chestnut blight fungus, puffball, smut.
Know five economically important fungi in each of the different groups of true fungi
Understand how lichens are identified and classified
Learn basic structure of lichen

PLANT KINGDOM BRYOPHYTES (20)

Know the features that distinguish the plant kingdom
Understand how bryophytes as a group differ from other plants
Learn the basic differences between thalloid liverworts and leafy liverworts
Explain how a liverwort thallus can be distinguished from a hornwort
Know the structures involved in the lifecycle of the mosses and in which structures meiosis and fertilization occur.
Learn which features liverworts, hornworts, and mosses have in common and understand how their sporophytes differ
Learn five uses of bryophytes by humans

SEEDLESS VASCULAR PLANTS (21)

Discuss the basic structural differences between bryophytes and vascular plants
Distinguish from one another the four phyla of seedless vascular plants
Contrast the differences in the life cycles of ground pines and spike mosses
Summarize the structural features of horsetail sporophytes
Know how to recognize and explain the functions of all the structures involved in the Alternation of Generations in a fern.
Identify and list 10 important uses of seedless vascular plants
Explain what a fossil is and distinguish among various types of fossils

SEED PLANTS; GYMNOSPERMS (22)

Learn the features common to typical conifer pollen and seed strobili and explain how they differ
Understand what distinguishes the phyla of living gymnosperms
Know the significance of seeds and their evolutionary importance

Learn the pineleaf modifications that adapt them to a harsh environment

Indicate where the following structures occur in the lifecycle of a pine tree: archegonia, eggs, sperms with flagella, male and female gametophytes, the sporophytes, integument, vessels, sporocytes, embryo, and pollen grains

Explain the function of each of the following: resin canals, mycorrhizal fungi, nucllus, generative cell, megaspore, microsporocyte

ID and learn a use for each of at least 10 different gymnosperms

ANGIOSPERM: (23)

Understand the basic differences between angiosperm and gymnosperms

Contrast 2 principal schools of thought concerning the origin of flowering plants and the nature of the first flowers

Diagram the lifecycle of a flowering plant, indicating shifts from haploid to diploid

Compare 2 types of female gametophyte development and learn how a male gametophyte develops

Know the characteristics of flowers associated with specific types of pollinators.

Know major trends of specialization in the flowering plants

Know the function of a herbarium and the techniques of preparing herbarium specimens

FLOWERING PLANTS AND CIVILIZATION (24)

Give reasons for basing scientific evaluation of more than a single sampling

Learn major regions of distribution of cultivated plants and id several plants from each region

Know characteristics of 10 flowering plant families

ID which families have flowers with many separate parts and superior ovaries

Know 5 useful plants in the laurel, rose, legume and spurge families

Id medicinal plants in the poppy and nightshade families

Construct a simple, original key to five flowering plant families.