

**Fayetteville State University
College of Arts and Sciences
Department of Natural Sciences**

I.LOCATOR INFORMATION

Semester: Fall

Year 2011

Credit Hours 4.00

Course Number and Name: Natural Sciences 120

Course Location & Meeting Time

Office Hours: TBA

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FSU Policy on Electronic Mail: Fayetteville State University provides to each student, free of charge, an electronic mail account that is easily accessible via the Internet. The university has established email as the primary mode of communicating with enrolled students about impending deadlines, upcoming events, and other information important to student progression at the university. Students are responsible for reading their email on a regular basis to remain aware of important information disseminated by the university. The university maintains open-use computer laboratories throughout the campus that can be used to access electronic mail.

Students making inquiries via email to FSU faculty and staff about academic records, grades, bills, financial aid, and other matters of a confidential nature are required to use their FSU email account.

Rules and regulations governing the use of FSU email may be found at:

<http://www.uncfsu.edu/PDFs/EmailPolicyFinal.pdf>

II. COURSE DESCRIPTION

NSCI 120 (4-3-2); (Modern Biology), an introductory course covering basic biological concepts that provides the student with a comprehensive survey of biological sciences. Some important areas which will be investigated are: cell structure and reproduction, energy relationships at the cellular level, genetics, DNA, evolution, ecology, bacteria, protists, fungi, plants, and animal organ systems. Prerequisite: NSCI 110

III. DISABLED STUDENT SERVICES

Division of Student Affairs Services for Students with Disabilities;
<http://www.uncfsu.edu/CFPD.htm>; Phone: (910)672-1222

The university continues to be sensitive to the identification of possible barriers to students with disabilities and attempts to make responsible accommodations for these students. Students with physical disabilities who need assistance in utilizing university services should register with the Center for Personal Development as soon as they are admitted to the university.

IV. INFORMATION LITERACY

In this course, students will learn to recognize when and how Biology research is useful to them and have the ability to choose, find and cite in their papers in APA format the scholarly literature that the Charles W. Chesnutt Library makes available.

V. TEXTBOOK

Audesirk, Audesirk, and Byers; Biology, Life on Earth, 9th Edition, Benjamin Cummings, (www.pearsonhighered.com), New York, 2010

Symbiosis Laboratory Manual: Modern Biology, Natural Science 120

THE CONCEPTUAL FRAMEWORK OF THE SCHOOL OF EDUCATION

The conceptual framework defines the vision of the Department of Biological Sciences which underscores the purpose of the School of Education in preparing its candidates for teaching and leadership roles in a global society. The unit prepares candidates who support student learning within the context of family and community participation for a diverse, technological, and global society. We achieve this vision through teaching, research, and service. Our conceptual framework serves as a lens through which we view our education professionals in the secondary education program. The themes of our conceptual framework include knowledgeable and reflective education professionals; working with families and communities; respect for diversity and individual worth; technological competence and educational applications; and caring dispositions and ethical responsibility.

VI. STUDENT LEARNING OUTCOMES

Upon completion of this course each student should be able to:

Demonstrates the ability to interpret information and use the scientific method in problem solving situations

- 1. Demonstrates an understanding of the way the science of biology is split into various divisions.**
- 2. Applies the scientific method to appropriate problem situations by the use of observation and experiment.**
- 3. Arranges the major groups of organisms into distinct categories based on their general characteristics.**

Demonstrates an understanding of the different kinds of cells, their organization and functioning.

- 1. Contrasts the theory of spontaneous generation (abiogenesis) with the cell theory (biogenesis).**
- 2. Relates the surface area to volume ratio of cells to their ability to carry on the life processes.**
- 3. Analyzes information about the different types of cells and determines their common characteristics.**
- 4. Illustrates the ways in which the prokaryotic cell differs from the eukaryotic cell.**

Demonstrates an understanding of the physical and biological

processes responsible for the movement of water and solutes in living systems.

- 1. Uses the Kinetic Molecular Theory to explain active and passive transport through cell membranes.**
- 2. Evaluates the effect of osmosis on different kinds of cells and tissues.**
- 3. Assesses the effect of concentration gradients on the movement of water and ions in living systems.**

Shows the involvement of energy and the laws of energy in life processes.

- 1. Illustrates the ways energy is transferred from one organic system to another.**
- 2. Evaluates the relationship between bond energy and stored Chemical/potential energy in organic compounds.**
- 3. Assesses the effect of various environmental factors such as temperature, pH and water on the action of enzymes.**
- 4. Compares and contrasts the process of photosynthesis with cellular respiration.**

Applies theories of heredity to illustrate how genetic information is stored and transferred from one living unit to another.

- 1. Contrasts the process of mitosis with meiosis in complex cells.**
- 2. Assesses the effect of sexual and asexual reproduction on populations of organisms.**
- 3. Uses the laws of genetics to solve genetic problems involving monohybrid and dihybrid crosses.**
- 4. Demonstrates an understanding of the ways genetic information is coded and transcribed from DNA.**
- 5. Illustrates the process of protein synthesis in a cell containing DNA, RNA and cellular energy.**

Demonstrates an understanding of biological evolution.

- 1. Describes the factors that can cause a change in the genetic makeup of a population.**
- 2. Explains the process of natural selection.**
- 3. Explains how species can be formed.**

Demonstrates knowledge of each of the five kingdoms of life.

- 1. Knows the main characteristics that distinguish viruses from bacteria and bacteria from Protista.**
- 2. Understands the harmful and beneficial effects of microorganisms.**
- 3. Contrasts the body plan of a fungus with its ecology.**
- 4. Compares vascular, nonvascular, seed and non seed plants.**
- 5. Knows the characteristics of the major animal phyla.**

Understands the functions of organ systems in the animal kingdom.

- 1. Identifies the components of blood and traces its flow through the human circulatory system.**
- 2. Explain how the body fights disease.**
- 3. Identifies the organs in the human digestive system and explains their functions.**
- 4. Understands the action of a respiratory system, by identifying its parts and indicating functions.**
- 5. Understands the role of the liver and kidneys in maintaining homeostasis.**
- 6. Sketches a neuron and identifies its cell body, axon, & dendrites.**
- 7. Describes how a nervous impulse is transmitted.**

- 8. Lists the major parts of the vertebrate brain and indicates an important function of each.**
- 9. Understands the effect of various drugs, including alcohol and nicotine on human behavior and the human nervous system.**
- 10. Describes how a muscle contracts**
- 11. Names the main endocrine glands, indicates where each is located in the human body, and gives their functions.**
- 12. Identifies the parts of the female and male reproductive systems and explains how they function.**

Understands basic concepts of ecology.

- 1. Understands how density of populations may be regulated.**
- 2. Illustrates the flow of energy through an ecosystem.**
- 3. Describes the general characteristics of the world's biomes and how nutrient cycles operate in them.**
- 4. Demonstrates an understanding of how human activities affect the biosphere.**

Demonstrates an understanding of vascular plant structure and growth.

- 1. Identifies the major tissues and hormones found in vascular plants and how they relate to structure and function**
- 2. Contrasts herbaceous stem development with woody stem development in higher plants.**

Demonstrates an understanding of vascular plant structure and growth.

- 3. Shows how flowering plants reproduce.**
- 4. Arranges the reproductive parts of a flower in correct order.**

Demonstrate the ability to properly research scholarly literature and incorporate references in their work.

- 1. Determines the nature and extent of the scholarly research needed.**
- 2. Efficiently and effectively searches the electronic and physical resources in the Chesnutt Library and critically evaluates the information found as it relates to his studies.**
- 3. Incorporates the ideas expressed in research into their own rhetorics and properly cite the ideas in APA format.**

1. NCDPI, OR SPECIALTY AREA STANDARDS

Standards Used in this Course	NCDPI Specialty Area Standards	Assessment(s)
1	Science teachers understand the unifying concepts of science.	Lecture and laboratory exams and quizzes.
2	Science teachers understand the nature of science and the development of scientific thought.	Lecture and laboratory exams and quizzes.
3	Science teachers understand the historical development of scientific thought and the application of science in society.	
4	Science teachers understand the math concepts and processes and the technologies that are used in science.	Lecture and laboratory exams and quizzes.

7. CORE STANDARDS

Include the NCDPI Core Standards and the assessment(s). Only include the standard or standards you will address in this course.

Standards Used in this	NCDPI Core Standards	Assessment(s)

Course		
	1. Teachers know the content they teach.	
	2. Teachers know how to teach students.	
	3. Teachers are successful in teaching a diverse population of students.	
	4. Teachers are leaders.	
	5. Teachers are reflective about their practice	
	6. Teachers respect and care about students.	

DIVERSITY

Diversity Standards Used in this Course	NCDPI Diversity Standards	Assessment(s)
	1. Teachers understand the central concepts, tools of inquiry, and structures of the discipline(s) they teach and can create classroom environments and learning experiences that make these aspects of subject matter accessible, meaningful and culturally relevant for diverse learners.	
	2. Teachers understand how students' cognitive, physical, socio-cultural, linguistic, emotional, and moral development influences learning and address these factors when making instructional decisions.	
	3. Teachers work collaboratively to develop linkages with parents/caretakers, school colleagues, community members and agencies that enhance the educational experiences and well being of diverse learners.	
	4. Teachers acknowledge and understand that diversity exists in society and utilize this diversity to strengthen the classroom environment to meet the needs of individual learners.	
	5. Teachers of diverse students demonstrate leadership by contributing to the growth and development of their	

	colleagues, their school and the advancement of educational equity.	
	6. Teachers of diverse students are reflective practitioners who are committed to educational equity.	

8. TECHNOLOGY

This course will help strengthen and enhance the candidates' technological competence and skill in using technology. Candidates will use a variety of technologies to enhance their knowledge of technology in this course.

	Technological Applications for this Course
x	Productivity tool (Power Point)
	Presentation software
	Internet
	Web page construction
x	e-mail
x	On-line applications
x	Grade book
	Video camera
	Scanner
	Excel
x	Smart board
x	Lap Top and LCD panel
x	Music Stereo and CD

Technology Standards Used in this Course	NCDPI Technology Standards	Assessment(s)
	1. Teachers demonstrate a sound understanding of technology operations and concepts.	
	2. Teachers plan and design effective learning environments and experiences supported by technology.	

	3. Teachers implement curriculum plans that include methods and strategies for applying technology to maximize student learning.	
	4. Teachers apply technology to facilitate a variety of effective assessment and evaluation strategies.	
	5. Teachers use technology to enhance their productivity and professional practice.	
	6. Teachers understand the social, ethical, legal and human issues surrounding the use of technology in PK-12 schools and apply those principles in practice.	

10. DISPOSITIONS

Professional Competence		Professional Responsibilities	
	Appreciates and engages in self-reflection		Dresses appropriately for the setting
	Shows a commitment to ongoing learning		Is punctual
	Desires to learn and apply new technologies		Attends class regularly and participates in the class
	Is receptive to new ideas and feedback		Completes assignments and tasks in a timely manner
	Writes and speaks clearly and effectively		Willing to go beyond required assignments
	Uses culturally sensitive language when communicating with families		Shows initiative and motivation
	Respects the privacy of students and their families		Assumes fair share of responsibilities
Professional Dispositions and Qualities		Professional Integrity	
	Believe all children can learn		Displays high and ethical professional standards
	Understands the culture of students and their families		Is honest and dependable

	Values and respects diversity and individual differences		Is courteous and respectful
	Demonstrates flexibility and adaptability		Has a positive professional attitude
	Treats all students fairly and equitably		Accepts and uses constructive criticism
	Is sensitive to the feelings of others		Maintains emotional control and appropriate behavior
	Interacts appropriately and positively with others		

Other _____

VI. GENERAL REQUIREMENTS

Evaluation Criteria

Grades:

Grades will be based on the following scale:

%	grade	%	grade
92-100	A	73-82	C
83-91	B	64-72	D
Below 64		F	

Approximate percentage weight of exams, quizzes and other graded assignments

Item	%
Hourly Exams/Research Paper	60
Quizzes or other work	10
Lab Work	10

VI..STUDENT RESPONSIBILITIES

The following revisions become effective on August 16, 2007:

- **WN - Withdrawal due to non-attendance - discontinued, effective August 16, 2007.**

STUDENTS: Do not expect faculty to withdraw you for non-attendance. Drop or withdraw* from classes according to the deadlines published in the catalog. *See warning below about class withdrawals.

NEW TYPE OF GRADE: INTERIM GRADES – (New name for “midterm grade,” with additional purposes). Interim grades will be assigned from the first week of the semester until the deadline for class withdrawals. Interim grades are used for informational and warning purposes only; they are not part of your permanent transcript and have no effect on your GPA. Instructors may assign interim grade of F to warn students of poor academic performance or they may assign “X” or “EA” grades. (See below for explanations) After midterm, faculty will assign all students an interim grade of A – F to inform students of their academic status as of midterm.

- **INTERIM GRADE X = NO SHOW** – Assigned to students who are on a class roster, but never attend class. For warning purposes only; NOT a final grade.

STUDENTS: Check interim grades early in the semester. If you have an X grade, either begin attending the class or withdraw* from it. *See warning below about class withdrawals. If you do not take action in response to an X grade, you will receive a final grade of FN. (See “FN” below)

- **INTERIM GRADE EA = EXCESSIVE ABSENCES** - Assigned to students whose class absences exceed 10% of the total contact hours. For warning purposes only, NOT a final grade.

STUDENTS: Check your interim grades often. If you have an “EA” grade for a class, you are in jeopardy of failure if you do not take immediate actions. Either resume attending the class or withdraw from it. *See warning below about class withdrawals.

NEW FINAL GRADE:

- **FN = FAILURE DUE TO NON-ATTENDANCE** – Assigned to students who are on class roster, but never attend the class. An FN grades is equivalent to an F grade in the calculation of the GPA.

STUDENTS: You must attend (or withdraw* from) all the classes for which you are enrolled. *See warning below about class withdrawals.

WARNING ABOUT CLASS WITHDRAWALS:

- When you withdraw from a class, you are wasting your money and time. You receive no refund for withdrawing from individual classes and you slow your progress toward degree completion.
- If you withdraw from or fail more than one-third of your classes, you will no longer be eligible for financial aid.
- **STRIVE TO EARN CREDIT FOR ALL THE CLASSES IN WHICH YOU ENROLL; WITHDRAW FROM CLASSES ONLY WHEN IT IS ABSOLUTELY NECESSARY!**

VII. ACADEMIC SUPPORT RESOURCES

TUTORIAL SESSIONS

Students who are earning less than a "C" average will be encouraged to attend tutorial sessions.

WRITING ASSIGNMENTS (Writing-across-the-curriculum)

In order to emphasize the importance of writing in the learning process, this course will require the student to do a certain amount of written work. Students will receive more information concerning this aspect of the course from the instructor during the first week of the semester. Students are encouraged to use resources such as Smarthinking, Criterion and University College Learning Center in course of the WAC projects.

VIII. COURSE OUTLINE***

WEEK OF	LESSON
AUG. 18	Orientation
	Scientific method & science
AUG. 22	Biological Molecules LAB: TBA
AUG. 29	Biological Molecules Diffusion, osmosis & transport Cell structure & function LAB # 1: The Process of Scientific Inquiry *
SEP. 5	LABOR DAY HOLIDAY
	Energy, enzymes & metabolism Photosynthesis

LAB # 2: Tools for Scientific Inquiry *

SEP. 12 ****** TEST 1 ******
Aerobic & anaerobic respiration
LAB # 3: Macromolecules *

SEP. 19 **Mitosis**
Meiosis & Genetics
LAB # 4: Microscope *

SEP. 26 **Human genetics**
DNA & Protein synthesis
LAB # 5: Cellular Respiration *

OCT. 3 ***** TEST 2 *****
Evolution
Evolution & Classification
LAB # 5
MIDTERM EXAMS

OCT. 10
Microorganisms, Animals
Respiratory & circulatory system
LAB#7 = Evolution

OCT. 17 **MIDTERM BREAK**
Immunity
Digestion & homeostasis
LAB # 8: Circulation *

OCT. 24
Research Paper First Draft Due
Nervous system & senses
Endocrine system
****** TEST 3 ******
LAB # 9: Digestion .

OCT. 31 **Reproduction/Development**
LAB # 10: Sensory System

NOV. 7 **Ecology**
LAB # 11: Ecology

NOV. 14
Fungi & plants

****** TEST 4 ******

LAB: TBA

NOV. 21 THANKSGIVING HOLIDAY
Plant Structure & Physiology
Research Paper Final Draft Due

NOV. 28.
Plant Structure & Physiology

NOV. 28 FINAL EXAMS (for graduating students)

DEC. 2 LAST DAY OF CLASS

DEC. 5 FINAL EXAMS (For non-graduating students)

DEC. 19 COMMENCEMENT

***** NSCI 120 LABORATORY SCHEDULE FOR ALL LABS *****

LAB 1 = PROCESS OF SCIENTIFIC INQUIRY

LAB 2 = TOOLS FOR SCIENTIFIC INQUIRY LAB 3 = MACROMOLECULES

**LAB 4 = MICROSCOPE LAB5 = CELLULAR
 RESPIRATION**

LAB 6 = GENETICS

LAB 7 = EVOLUTION

LAB 8 = CIRCULATION

LAB 9 = DIGESTION

LAB 10= SENSORY SYSTEM

LAB 11= ECOLOGY

*** = Laboratory Activity to be Announced**

WEEK OF	MON.	TUE.	WED.	THURS.	FRI.
AUG. 22	*	*	*	*	*
AUG. 29	1	1	1	1	1
SEP. 5	2	2	2	2	2
SEP. 12	*	3	3	3	3

SEP. 19	3	4	4	4	4
SEP. 26	4	5	5	5	5
OCT. 3	5	6	6	6	6
OCT. 10	6	7	7	7	7
OCT. 24	7	8	8	8	8
OCT. 31	8	9	9	9	9
NOV. 7	9	10	10	10	10
NOV. 14	10	11	11	11	11
NOV. 21	11	*	*	*	*

***** This is a tentative schedule. The instructor reserves the right to alter it at any time. It is your responsibility to be in class and check your blackboard page in order to keep pace with any changes made to the schedule or assignments.*****

IX. TEACHING STRATEGIES

The principal teaching strategies will be lecture, discussion, and laboratory exercises.

X. REFERENCES

All general biology students are encouraged to use the library and to do supplemental reading in the biological sciences. The following science periodicals provide a source of current information in a format appropriate for both the major and non-major biology student.

1. Discover
2. Science Digest
3. Scientific American
4. Science
5. Science News
6. Nature

7. Natural History

World Wide Web Site:

Audesirk Companion Web Site: <http://www.prenhall.com/audesirk3>