



COURSE OUTLINE

DIVISION: Natural Sciences Business

COURSE: Biology 1001-General Biology

Date: Fall, 2013

Credit Hours: 4

Prerequisite(s): None

Delivery Method: **Lecture** **2 Contact Hours** (1 contact = 1 credit hour)
 Seminar **1 Contact Hours** (1 contact = 1 credit hour)
 Lab **2 Contact Hours** (2 contact = 1 credit hour)
 Clinical **0 Contact Hours** (3 contact = 1 credit hour)
 Online
 Blended

Offered: **Fall** **Spring** **Summer**

IAI Equivalent –**Only for Transfer Courses**-go to <http://www.itransfer.org>: L1-900L

CATALOG DESCRIPTION:

An integrated course covering the fundamentals of the plant and animal world. Special attention is given to the structure and function of cells, the genetic continuity of life, and evolution.

GENERAL EDUCATION GOALS ADDRESSED

[See the last page of this form for more information.]

Upon completion of the course, the student will be able:

[Choose those goals that apply to this course.]

- To apply analytical and problem solving skills to personal, social and professional issues and situations.
- To communicate orally and in writing, socially and interpersonally.
- To develop an awareness of the contributions made to civilization by the diverse cultures of the world.
- To understand and use contemporary technology effectively and to understand its impact on the individual and society.
- To work and study effectively both individually and in collaboration with others.
- To understand what it means to act ethically and responsibly as an individual in one's career and as a member of society.
- To develop and maintain a healthy lifestyle physically, mentally, and spiritually.
- To appreciate the ongoing values of learning, self-improvement, and career planning.

EXPECTED LEARNING OUTCOMES AND RELATED COMPETENCIES:

[Outcomes related to course specific goals.]

Upon completion of the course, the student will be able to:

1. Identify the cell as the fundamental unit of all living organisms and demonstrate an understanding of the complex physical and chemical changes that constitutes life.
 - 1.1 Distinguish between prokaryotic and eukaryotic cells by description and examples.
 - 1.2 Identify and state the function of animal cell organelles.
 - 1.3 Identify and state the function of plant cell organelles.
 - 1.4 Describe the characteristics of life.
 - 1.5 Describe the taxonomy of living organisms.
 - 1.6 Distinguish between organic and inorganic compounds.
 - 1.7 Demonstrate an understanding of the structure of the basic units of matter: atoms, molecules and compounds.
2. Demonstrate an understanding of the exchange of materials and energy between living organisms and their environments.
 - 2.1. Define and describe ways that molecules may enter or exit cells.
 - 2.2. Describe how solar energy is converted into chemical energy via photosynthesis.
 - 2.3. Describe and identify the structural and functional aspects of photosynthesis.
 - 2.4. Demonstrate an understanding of both aerobic and anaerobic cellular respiration.

3. Demonstrate an understanding of how living organisms maintain their internal environment.
 - 3.1. Define and describe the function of enzymes and their role in metabolism.
 - 3.2. Demonstrate an understanding of environmental factors that affect enzymes.
 - 3.3. Define and describe how living organisms maintain homeostasis.
4. Demonstrate an understanding of the continuity of life based on the reproduction of cells.
 - 4.1. Name, describe and identify the stages of mitosis.
 - 4.2. Describe the differences between plant and animal cell mitosis.
 - 4.3. Name, describe and identify the stages of meiosis.
5. Demonstrate an understanding of the genetic inheritance of parental traits and its chemical basis.
 - 5.1. Describe and explain the structure and function of DNA and RNA.
 - 5.2. Demonstrate an understanding of the Central Dogma of Molecular Genetics.
 - 5.3. Demonstrate an understanding of Mendelian Genetics and the related components.
 - 5.3 Demonstrate an understanding of the molecular basis of inheritance, including its role in genetic variations, genetic mutations and genetic disorders.
6. Demonstrate an understanding of the embryonic development and growth of animals and identify the associated stages.
 - 6.1 Identify and describe the four early embryonic stages of development- cleavage, blastula, gastrula, and neurula.
 - 6.2 Identify the three germ layers and the major organs that arise from each layer.
 - 6.3 Describe and explain differentiation and morphogenesis and how they relate to developmental embryology.
 - 6.4 Describe and explain the development of the human embryo and fetus.
7. Demonstrate an understanding of plant organization and structure.
 - 7.1 Identify the structures and functions of the major components of a flowering plant body- roots, stems, and leaves.
 - 7.2 Describe the differences between monocotyledons and dicotyledons.

- 7.3 Identify and describe the major plant tissues.
8. Demonstrate an understanding of the process of evolution: How and why living organisms change over time.
 - 8.1 Describe and explain chemical evolution.
 - 8.2 Describe and explain the process of natural selection and how it pertains to evolution.
 - 8.3 Identify and understand the evidence that supports the theory of evolution.

COURSE TOPICS AND CONTENT REQUIREMENTS:

1. The Study of Life
2. The Molecules of Cells
3. Cell Structure and Function
4. Membrane Structure and Function
5. Cell Division
6. Metabolism: Energy and Enzymes
7. Cellular Respiration
8. Photosynthesis
9. Plant Organization and Function
10. Development and Aging
11. Patterns of Gene Inheritance
12. Chromosomal Basis of Inheritance
13. DNA Structure and Control of Gene Expression
14. Evolution of Life

INSTRUCTIONAL METHODS:

1. Lecture - open to question and answer dialogue.
2. Discussions in small group seminars.
3. Laboratory experiences.
4. Visual aids – Powerpoint presentations, films, videotapes, videodiscs, overhead projector, slides, transparencies, charts, and models.
5. Computers - Internet, Web sites, DVD's and CD-ROM's.
6. Exams and quizzes in lectures, seminars and laboratory.
7. Supplemental readings - college library or internet.

INSTRUCTIONAL MATERIALS:

1. Text: Inquiry into Life, 14th Edition, Mader, Wm. C. Brown.
2. Lab Manual: BIO 1001 Customized Lab Manual, Mader, Wm. C. Brown.
3. Transparencies: Inquiry into Life, Mader, Wm. C. Brown.
4. Video Tapes - Audio Visual Department
 - a. Inquiry into Life (205 A)
 - b. Introduction to the Living Cell (19 B)
 - c. Diffusion and Osmosis (117 A)
 - d. Cell Biology: Structure and Composition (66 B)
 - e. Mitosis (260 A)
 - f. Meiosis (255 AA)
 - g. Laws of Heredity (205)
 - h. DNA - Protein Synthesis (120 B)
 - i. Cellular Respiration (67)
 - j. Amphibian Embryo: Frog and Salamander (18 A)
 - k. Genetic Biology (168 A)
 - l. The Human Body: Systems Working Together (193 M)
 - m. Evolutionary Biology (145 AA)
 - n. Man: The Incredible Machine (242)
 - o. Photosynthesis: A Biochemical Process (278)
5. Tissues Slides - Biology Laboratory
6. Laboratory equipment and supplies - Biology Laboratory

STUDENT REQUIREMENTS AND METHODS OF EVALUATION:

1. Textbook reading - assignments
2. Supplemental readings - library and elsewhere
3. Participation in class discussion, particularly in seminar
4. Performing assigned laboratory exercises
 - A. Opportunity for optional and additional laboratory projects, and receiving evaluation.
5. Laboratory reports and tests
 - A. Some designated form of brief report or written evidence of accomplishment for each laboratory exercise
 - B. Periodic practical tests or quizzes (following every two or three exercises) on laboratory work

6. Written and oral exams (in addition to those for laboratory)
 - A. Three or four major 1 hour exams and 2 hour semester final exam.
 - B. Several minor tests or quizzes in lecture and seminar.
 - C. Occasionally oral testing or quizzes on individual basis (particularly for make-up or other special cases.)

OTHER REFERENCES

1. Text: Inquiry into Life, 13th Edition, Mader, Wm. C. Brown
2. Journals such as BioScience, Scientific American, Science, American Biology Teacher, Natural History, American Zoologist, Science Digest, and other selected periodicals and pamphlets, including numerous governmental publications in the Federal Depository Library.
3. General Science Index and other indexes: various science encyclopedic volumes and dictionaries: various biological handbooks.
4. Computerized data search facilities and materials.
5. Reference texts, and numerous other biological science books, such as
 - A. Arms and Camp - Biology, A Journey into Life 2nd Ed. 1991
 - B. Raven and Johnson - Understanding Biology - 1991
 - C. Starr - Biology: Concepts and Applications - 1991
 - D. Cambell - Biology (2nd Ed.) - 1990
 - E. Starr and Taggart - Biology: The Unity and Diversity of Life - 1989
 - F. Audesirk and Audesirk - Biology: Life and Earth - (2nd Ed.) 1989
 - G. Bailey - Evolution and Genetics: The Molecules of Inheritance -1995
 - H. Davis, Solomon, and Berg - The World of Biology - 1990
 - I. Alberts, et al - Molecular Biology of the Cell - 1989
 - J. Hickman, et al - Biology of Animals - 1990
 - K. Wilson - Biodiversity - 1986
 - L. Mitchell, et al - Zoology - 1988
 - M. Levitan - Textbook of Human Genetics - 1988
 - N. Suzuki and Knudtson - Genetics, the Clash, etc. - 1989
 - O. Friefelder - Molecular Biology - 1986
 - P. Palade, et al (eds.) Annual Review of Cell Biology - 1989
 - Q. Re - Bioburst - 1986
 - R. Weaver and Hedrick - Genetics - 1989
 - S. Barrett, et al - Biology - 1986
 - T. Jones and Luchsinger - Plant Sysematics - 1986
 - U. King - Cell Biology - 1986
 - V. Day - Genesis on Planet Earth
 - W. Hopper and Hart - Foundations of Animal Development
 - X. Eldridge - Unfinished Synthesis - 1985
 - Y. Keeton and Gould - Biological Science - (4th Ed.)
 - Z. Wilson and Loomis - Botany

Course Competency/Assessment Methods Matrix

Course Prefix, Number and Name	Assessment Options																																
For each competency/outcome place an "X" below the method of assessment to be used.	Assessment of Student Learning	Article Review	Case Studies	Group Projects	Lab Work	Oral Presentations	Pre-Post Tests	Quizzes	Written Exams	Artifact Self Reflection of Growth	Capstone Projects	Comprehensive Written Exit Exam	Course Embedded Questions	Multi-Media Projects	Observation	Writing Samples	Portfolio Evaluation	Real World Projects	Reflective Journals	Applied Application (skills) Test	Oral Exit Interviews	Accreditation Reviews/Reports	Advisory Council Feedback	Employer Surveys	Graduate Surveys	Internship/Practicum /Site Supervisor Evaluation	Licensing Exam	In Class Feedback	Simulation	Interview	Written Report	Assignment	
	Direct/Indirect	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	I	I	I	I	D	D							
Assessment Measures – Are direct or indirect as indicated. List competencies/outcomes below.																																	
Identify the cell as the fundamental unit of all living organisms and demonstrate an understanding of the complex physical and chemical changes that constitutes life.		X		X	X	X	X	X	X				X					X								X			X		X	X	
Demonstrate an understanding of the exchange of materials and energy between living organisms and their environments.		X		X	X	X	X	X	X				X					X								X			X	X	X		
Demonstrate an understanding of how living organisms maintain their internal environment.		X		X	X	X	X	X	X				X					X							X			X	X	X			
Demonstrate an understanding of the continuity of life based on the reproduction of cells.		X		X	X	X	X	X	X				X					X						X			X	X	X	X	X		

Demonstrate an understanding of the embryonic development and growth of animals and identify the associated stages.	x		x	x	x	x	x	x		x																										x			x	X		
Demonstrate an understanding of plant organization and structure.	x		x	x	x	x	x	X		x																											x			x	X	
Demonstrate an understanding of the process of evolution: How and why living organisms change over time.	x		x	x	x	x	x	x		x																											x			x	X	
Demonstrate an understanding of the genetic inheritance of parental traits and its chemical basis.	x		x	x	x	x	x	x		x																												x			x	X