Mississippi College 2/2012

Department	Biology							Chemistry and Biochemistry						Mathematics	Computer Science and Physics				
Course #	Bio 111	Bio 112	Bio 305	Bio 306	Bio 307	Bio 403	Bio 412	CHE 141	CHE 142	CHE 303/313	CHE 304/314	CHE 418	CHE 419	207	PHY 151	PHY 152	PHY 251	PHY 252	
Course Name	Biology 1	Biology 2	Cell Biology	Genetics	Cell and Genetics Lab	Histology	Medical Physiology	General Chemistry I with Lab	General Chemistry II with Lab	Organic Chemistry I with Lab	Organic Chemistry II with Lab	Biochemistry I: Macromolecules	Biochemistry II: Metabolism	Statistics	General Physics I	General Physics II	Fundamentals of Physics I	Fundamentals of Physics II	**Entering Student Competency (E1, E2, E3,…), Learning Objectives (1,2,3..) and Examples (bullet points)**
Pre-requisite(s), if any	none	Bio 111	Bio 111	Bio 111	Bio 111	Bio 305	Physics 2, Bio 305		CHE 141	CHE 141, 142	CHE 303/313	CHE 304 & BIO 111 or Instructor's Consent	CHE 304 & BIO 111 or Instructor's Consent	MAT 101	MAT 102 or MAT 121 or MAT 206	PHY 151	MAT 122 (co-req)	PHY 251	
Required for Major?	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Offerred to Non-major?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes, with prerequisites	Yes, with prerequisites	Yes, with prerequisites	Yes, with prerequisites	Yes	Yes	Yes	Yes	Yes	
	E1- Apply quantitative reasoning and approp				X			X	X			X	X						**E1- Apply quantitative reasoning and appropriate mathematics to describe or explain phenomena in the natural world**
	X	X			X		X	X	X	X	X	X	X	X	X	X	X	X	1. Demonstrate quantitative numeracy and facility with the language of mathematics.
	X	X			X		X	X	X	X	X	X	X	X	X	X	X	X	2. Interpret data sets and communicate those interpretations using visual and other appropriate tools.
	X	X		X	X			X	X			X	X	X	X	X	X	X	3. Make statistical inferences from data sets.
					X			X	X	X	X	X	X						4. Extract relevant information from large data sets.
	X				X			X	X	X	X	X	X		X	X	X	X	5. Make inferences about natural phenomena using mathematical models.
	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	6. Apply algorithmic approaches and principles of logic (including the distinction between cause/effect and ssociation) to problem solving.
	X		X	X	X		X	X	X	X	X	X	X		X	X	X	X	7. Quantify and interpret changes in dynamical systems.
	E2- Demonstrate understanding of the proce				X			X	X	X	X	X	X						**E2- Demonstrate understanding of the process of scientific inquiry, and explain how scientific knowledge is discovered and validated.**
	X	X			X			X	X	X	X	X	X		X	X	X	X	1. Develop observational and interpretive skills through hands-on laboratory or field experiences.
	X	X			X			X	X	X	X	X	X		X	X	X	X	2. Demonstrate ability to measure with precision, accuracy, and safety.
	X	X	X		X			X	X	X	X	X	X		X	X	X	X	3. Be able to operate basic laboratory instrumentation for scientific measurement.
	X	X			X			X	X	X	X	X	X						4. Be able to articulate (in guided inquiry or in project-based research) scientific questions and hypotheses, design experiments, acquire data, perform data analysis, and present results.
			X		X			X	X	X	X	X	X						5. Demonstrate the ability to search effectively, to evaluate critically, and to communicate and analyze the scientific literature.
	E3- Demonstrate knowledge of basic physical principles and their applications to the understanding of living systems.																		**E3- Demonstrate knowledge of basic physical principles and their applications to the understanding of living systems.**
					X				X			X			X	X	X	X	1. Demonstrate understanding of mechanics as applied to human and diagnostic systems.
					X					X	X					X		X	2. Demonstrate knowledge of the principles of electricity and magnetism (e.g., charge, current flow, resistance, capacitance, electrical potential, and magnetic fields).
									X							X		X	3. Demonstrate knowledge of wave generation and propagation to the production and transmission of radiation.
							X		X	X	X	X	X		X		X		4. Demonstrate knowledge of the principles of thermodynamics and fluid motion.
								X	X	X	X	X							5. Demonstrate knowledge of principles of quantum mechanics, such as atomic and molecular energy levels, spin, and ionizing radiation.
	X		X			X	X	X	X	X	X	X	X						6. Demonstrate knowledge of principles of systems behavior, including input–output relationships and positive and negative feedback.
	E4- Demonstrate knowledge of basic principles of chemistry and some of their ap							X	X	X	X	X	X						**E4- Demonstrate knowledge of basic principles of chemistry and some of their applications to the understanding of living systems.**
	X							X	X	X	X	X	X						1. Demonstrate knowledge of atomic structure.
								X	X	X	X	X	X						2. Demonstrate knowledge of molecular structure.
	X							X	X	X	X	X	X						3. Demonstrate knowledge of molecular interactions.
	X		X					X	X	X	X	X	X						4. Demonstrate knowledge of thermodynamic criteria for spontaneity of physical processes and chemical reactions and the relationship of thermodynamics to chemical equilibrium.
	X							X	X	X	X	X	X						5. Demonstrate knowledge of principles of chemical reactivity to explain chemical kinetics and derive possible reaction mechanisms.
	X							X	X	X	X	X	X						6. Demonstrate knowledge of the chemistry of carbon-containing compounds relevant to their behavior in an aqueous environment.
	X	**E5- Demonstrate knowledge of how biomolecules contribute to the structure and function of cells.**																	**E5- Demonstrate knowledge of how biomolecules contribute to the structure and function of cells.**
	X		X									X	X						1. Demonstrate knowledge of the structure, biosynthesis, and degradation of biological macromolecules.
	X		X									X	X						2. Demonstrate knowledge of the principles of chemical thermodynamics and kinetics that drive biological processes in the context of space (i.e., compartmentation) and time: enzyme-catalyzed reactions and metabolic pathways, regulation, integration, and the chemical logic of sequential reaction steps.
	X		X	X			X					X	X						3. Demonstrate knowledge of the biochemical processes that carry out transfer of biological information from DNA, and how these processes are regulated.
	X			X	X														4. Demonstrate knowledge of the principles of genetics and epigenetics to explain heritable traits in a variety of organisms.
	E6- Apply understanding of principles of how molecular and cell assemblies, organs, and organisms develop structure and carry out function.																		**E6- Apply understanding of principles of how molecular and cell assemblies, organs, and organisms develop structure and carry out function.**
	X	X	X	X		X						X	X						1. Employ knowledge of the general components of prokaryotic and eukaryotic cells, such as molecular, microscopic, macroscopic, and three-dimensional structure, to explain how different components contribute to cellular and organismal function.
	X		X			X													2. Demonstrate knowledge of how cell–cell junctions and the extracellular matrix interact to form tissues with specialized function.
	X			X															3. Demonstrate knowledge of the mechanisms governing cell division and development of embryos.
			X				X												4. Demonstrate knowledge of the principles of biomechanics and explain structural and functional properties of tissues and organisms.
	E7- Explain how organisms sense and control their internal environ						X												**E7- Explain how organisms sense and control their internal environment and how they respond to external change.**
							X					X	X						1. Explain maintenance of homeostasis in living organisms by using principles of mass transport, heat transfer, energy balance, and feedback and control systems.
							X					X	X						2. Explain physical and chemical mechanisms used for transduction and information processing in the sensing and integration of internal and environmental signals.
						X	X												3. Explain how living organisms use internal and external defense and avoidance mechanisms to protect themselves from threats, spanning the spectrum from behavioral to structural and immunologic responses.
	X	X		X	**E8- Demonstrate an understanding of how the organizing principle of evolution by natural selection explains the diversity of life on earth.**														**E8- Demonstrate an understanding of how the organizing principle of evolution by natural selection explains the diversity of life on earth.**
	X	X		X								X							1. Explain how genomic variability and mutation contribute to the success of populations.
	X	X		X															2. Explain how evolutionary mechanisms contribute to change in gene frequencies in populations and to reproductive isolation.