PROPOSED BIOLOGY CORE CURRICULUM

To Faculty of California Community Colleges, California State Universities, and Universities of California

At last year's IMPAC meetings faculty expressed a strong interest in defining lower division core requirements as a series of modules rather than a collection of courses. The primary focus at this year's IMPAC meetings was the completion of this goal. The results are presented in the attached table as hierarchical arrangement of Topics/Elements/Content. Faculty at the statewide meeting determined not to use the term module to describe the curriculum. As you review and comment on the content of this document, please consider the following comments and questions:

1. Although information in the grid is arranged by general *Topic* (diversity, ecology, evolution, genetics etc.) in a macro to micro sequence, this arrangement is not intended to suggest a teaching sequence. It is for convenience only.
2. The *Elements* placed under each *Topic* are intended to represent areas of emphasis common to most lower division core courses in the field. They are not necessarily intended to be lecture topics but rather groups of lectures that would normally take 1-2 weeks to complete. The organization of *Elements* under each *Topic* is also not intended to suggest a sequence for developing and teaching undergraduate core courses.
3. The content column is intended to suggest a definable body of knowledge within each *Element*. Please consider the following in your review. Does the content need to be modified to more clearly define each *Element*? Do these *Elements* need more content or less? Is the content primarily taught in a qualitative manner? Does some content clearly require a quantitative approach that should be so designated?
4. There is no assignment of content to lecture or laboratory. Is it necessary to assign content to lecture or laboratory? Or is that decision best left to individual institutions?
5. The designation 'min' occurs in the right-most column adjacent to certain content. This designation was assigned when the majority of faculty felt the content should be included but generally received minimal treatment. Should such a designation remain or should these topics be eliminated from the core?

	TOPIC/ELEMENT	ELEMENT CONTENTS (WITH CORRESPONDING CAN COURSE NUMBER)	TIME
DIVERSITY	PLANT DIVERSITY	plant system structure and function (CAN6) systematics and taxonomy (CAN6) phylogeny (CAN6)	
	ANIMAL DIVERSITY	animal system structure and function (CAN4) systematics and taxonomy (CAN4) phylogeny (CAN4) homeostasis (CAN2) development (CAN4) behavior (CAN4)	
	PROKARYOTIC DIVERSITY	structure and function of Archaea, Bacteria (CAN2) structure and function of protist groups (CAN4, CAN6) structure and function of fungi (CAN6) viruses (CAN2)	min

	TOPIC/ELEMENT	ELEMENT CONTENTS (WITH CORRESPONDING CAN COURSE NUMBER)	TIME
ECOLOGY	POPULATION ECOLOGY	population structure, growth, regulation, fluctuations (CAN4) intraspecific interactions (CAN4) social systems and behavior (CAN4) physical environment as a selective force (CAN4,6)	min
	COMMUNITY ECOLOGY	interspecific interactions: predator-prey, competition, symbiosis (CAN6) community structure, regulation of community structure (CAN6) temporal change in community structure (CAN6)	min
	ECOSYSTEMS	energy flow (CAN6) nutrient cycling (CAN6) conservation biology	min

	TOPIC/ELEMENT	ELEMENT CONTENTS (WITH CORRESPONDING CAN COURSE NUMBER)	TIME
EVOLUTION	MOLECULAR EVOLUTION	evolutionary change in nucleotide sequences rates and patterns of nucleotide substitution molecular phylogeny evolution by gene duplication, transposition	min min min min
	MICRO EVOLUTION	natural selection (CAN 4) alternate theories (CAN4) speciation (CAN4)	
	MACRO EVOLUTION	speciation (CAN4) mutations rates evolutionary history extinction (CAN4) fossil record (CAN4)	

	TOPIC/ELEMENT	ELEMENT CONTENTS (WITH CORRESPONDING CAN COURSE NUMBER)	TIME
GENETICS	TRANSMISSION GENETICS (ALTERNATIVELY REFERS TO MENDELIAN OR CLASSICAL GENETICS)	monohybrid inheritance patterns (CAN2) dihybrid inheritance patterns (CAN2) gene interactions sex-linked inheritance patterns (CAN2) linkage, gene mapping haploid genetics microbial genetics	 min min
	POPULATION GENETICS	changes in allelic frequencies (CAN4) mechanisms of change (CAN4) Hardy-Weinberg equilibrium model	
	MOLECULAR GENETICS (ALTERNATIVELY MOLECULAR BIOLOGY)	DNA structure, synthesis, replication CAN2) Gene structure (CAN2) Gene expression: transcription, translation (CAN2) Genome structure (CAN2) Error and repair (CAN2) Control of gene expression	

	TOPIC/ELEMENT	ELEMENT CONTENTS (WITH CORRESPONDING CAN COURSE NUMBER)	TIME
CELL BIOLOGY	STRUCTURE AND FUNCTION PROKARYOTIC CELLS EUKARYOTIC CELLS	Membranes: chemical composition, organization, biophysical properties, transport Intracellular traffic: ER, golgi, protein synthesis and distribution, secretory pathways, endocytosis, lysosomes, cellular digestion, cytoskeleton (CAN2)	
	CELL REPRODUCTION	simple cell division (mitosis), fission (CAN2) cell cycle: variations and molecular control (CAN2) sexual reproduction and meiosis (CAN2)	
	CELL COMMUNICATION (ALT. SIGNALING)	receptors and signal transduction (CAN2)	
	IMMUNOLOGY	(CAN2)	optional or minimal

	TOPIC/ELEMENT	ELEMENT CONTENTS (WITH CORRESPONDING CAN COURSE NUMBER)	TIME
BIOCHEMISTRY	PHOTOTROPHIC ENERGY METABOLISM	photosynthesis (CAN2)	
	CHEMOTROPHIC ENERGY METABOLISM	glycolysis (CAN2) fermentation (CAN2) aerobic respiration (CAN2) alternative energy producing pathways (CAN2)	
	MOLECULAR STRUCTURE	carbohydrates, lipids, proteins (CAN2)	
	ENZYMES	kinetics mechanisms of action (CAN2) energetics controls	min min
	MOLECULAR METABOLISM	synthesis, storage, and degradation of carbohydrates, lipids (CAN2) storage, and degradation of proteins (CAN2)	min min