Rule 24 Matrix Revised: March 2007 Table of Alignment of Standards and Assessments

Endorsement: Biology Total Hours Required by Rule 24: 36 Grade Levels: 7-12 Program Hours Required by Institution: 37 Endorsement Type: Subject Name of Institution: Concordia University, Nebraska

Endorsement Program Requirements: Nebraska teacher education institutions offering this endorsement program must have on file, within the institution, a plan which identifies the courses and the course completion requirements which the institution utilizes to grant credit toward completion of this endorsement.

(For additional lines in each section, please go to the last column and press the tab key.)

Standard/Description								
006.07D Certification Endorsement Requirements: This endorsement shall require a minimum of 36 semester hours of laboratory based courses in the natural sciences (biology, chemistry, earth science, and physics), of which 24 semester hours must be in biology and a minimum of 12 semester hours of laboratory based courses among the remaining three natural sciences areas. A laboratory-based course provides activity-based, hands-on experience for all students. Laboratory activities shall be designed to allow students to develop scientific skills and processes, discover and construct science concepts, and allow for the application of the concept to the real lives of students. Course # Title and Credits Course Assessment(s)			Candidate Proficiencies					
Course #, Title, and Credits	Course Assessment(s)	Key Program Assessment(s)	Content Knowledge	Pedagogical Knowledge	Skills	Dispositions	P-12 Student Learning	
Chem 115 College Chemistry (4)								
Sci/Geog 281 Physical geography and Geology (4) Phys 110 Principles of Physics (4)								
Bio-111 General Biology I (4)								
Bio 112 General Biology II (4) Bio 208 Genetics (3)								
Bio 122 General Zoology (3)								
Bio 243 Anatomy and Physiology (3) OR								
Anatomy and Physiology II (4) and Bio 344 Anatomy and Physiology II (4)								
(If Bio 343 & Bio 344 taken, no electives required)								
(4 hours biology electives from Bio 225, 271, 308,								
319, 345, 351, 362, 363, 371, 399)								
Bio 225 Vertebrate Anatomy and Morphology (3) Bio 271 Embryology (3)								
Bio 308 Modern techniques in genetics (3)								
Bio 319 Cell & Molecular Biology (3) Bio 345 Midwest Flora (3)								
Bio 351 Microbiology (4)								
Bio 362/363 Study tours (marine bio or rainforest biology) (3)								
Bio 371 Biology of the Brain (3)								
Bio 399 Research in Biology (3)								
Educ 373 Methods in Secondary Science								

Standard/Description

A. Demonstrate knowledge and understanding of and be able to teach the concepts, skills and processes of science as defined in the Nebraska Content Standards for eighth and twelfth grades. Preparation for subject endorsements will not include the same level of depth of understanding as the Natural Science endorsement. Demonstrate the appropriate depth of understanding of the subject area endorsement.				Cand	idate Proficie	ncies	
Course #, Title, and Credits	Course Assessment(s)	Key Program Assessment(s)	Content Knowledge	Pedagogical Knowledge	Skills	Dispositions	P-12 Student Learning
Educ 373 Methods in Secondary Science	Year Plan	Year Plan	Х	Х		X	х

Standard/Description									
 B. Design and manage safe and supportive learning environments reflecting high expectations for the success of all students, including being able to: 1. Manage physical spaces within which science learning occurs; 2. Demonstrate proper treatment and ethical use of living organisms; and 3. Demonstrate safety in all areas related to science instruction; 				Cand	idate Proficie	ncies			
Course #, Title, and Credits	Course Assessment(s)	Key Program Assessment(s)	Content Knowledge	Pedagogical Knowledge	Skills	Dispositions	P-12 Student Learning		
Bio 112 General Biology II (4) Chem 115 General Chemistry (4) Educ 373 Methods in Secondary Science (3)	Laboratory Safety Lab Laboratory Safety Notes Microlesson Feedback Form	Chem 115 Lab safety Notes	X X X	Х	X X	x	x		

tandard/Description									
 C. Relate science to the community and to use human and institutional resources in the community to advance the education of their students in science, including being able to: 1. Utilize social and community support networks; 2. Relate science teaching and learning to the needs and values of the community; and 3. Involve people and institutions from the community in the teaching of science; 			Candidate Proficiencies						
Course #, Title, and Credits	Course Assessment(s)	Key Program Assessment(s)	Content Knowledge	Pedagogical Knowledge	Skills	Dispositions	P-12 Student Learning		
Educ 373 Methods in Secondary Science	Homework		X	X		X	X		

Standard/Description									
 D. Apply the unifying concepts and processes that help students think about and integrate a range of basic ideas which build an understanding of the natural world, including: Systems, order and organization; Evidence, models and explanation; Change, constancy and measurement; Evolution and equilibrium; and Form and function 				Cand	lidate Proficie	ncies			
Course #, Title, and Credits	Course Assessment(s)	Key Program Assessment(s)	Content Knowledge	Pedagogical Knowledge	Skills	Dispositions	P-12 Student Learning		
Bio 111 General Biology I (4) Bio 112 General Biology II (4) Geog 281 Physical Geography and Geology (4)	Test, Lab Test, Lab Test	Bio 111 Final Bio 112 Midterm	X X X		X X				

Standard/Description

 E. Apply the processes of scientific inquiry, including the ability to: 1. Identify questions and concepts that guide scientific investigations; 2. Design and conduct scientific investigations; 3. Use appropriate tools and techniques to gather, analyze and interpret data; 4. Develop descriptions, explanations, predictions and models using evidence; 5. Think critically and logically to make relationships between evidence and explanation; 6. Recognize and analyze alternative explanations and models; 7. Communicate and defend a scientific argument; and 8. Understand the unique characteristics of scientific inquiry 			Cand	lidate Proficie	ncies		
Course #, Title, and Credits	Course Assessment(s)	Key Program Assessment(s)	Content Knowledge	Pedagogical Knowledge	Skills	Dispositions	P-12 Student Learning
Bio-111 General Biology I (4) Bio 112 General Biology II (4) Bio 317 Ecology and Field Biology (3)	Test, Lab Test, Lab Test, Lab	Bio 317 Rodent Distribution Lab	X X X		X X X		

itandard/Description										
 F. Apply physical science facts, concepts, principles, theories and models, including: 1. Structure and properties of the atom; 2. Structure and properties of matter; 3. Chemical reactions; 4. Motions and forces; 5. Conservation of energy and increase in disorder; and 6. Interactions of energy and matter; 				Cand	idate Proficie	ncies				
Course #, Title, and Credits	Course Assessment(s)	Key Program Assessment(s)	Content Knowledge	Pedagogical Knowledge	Skills	Dispositions	P-12 Student Learning			
Phys 110 Principles of Physics (4) Chem 115 General Chemistry (4)	Tests, Lab Tests	Chem 115 ACS Exam Scores	X X		x					

Standard/Description							
 G. Apply life science facts, concepts, principles, theories and models, including: 1. The cell; 2. Molecular basis of heredity; 3. Biological evolution; 4. Interdependence of organisms; 5. Matter, energy and organization in human and other living systems; and 6. Behavior of organisms; 				Cand	idate Proficie	ncies	
Course #, Title, and Credits	Course Assessment(s)	Key Program Assessment(s)	Content Knowledge	Pedagogical Knowledge	Skills	Dispositions	P-12 Student Learning
Bio-111 General Biology I (4) Bio 112 General Biology II (4) Bio 208 Genetics (3)	Test, Lab Test, Lab Test,	Bio 111 Final Exam Bio 112 Midterm	X X X		X X		

Standard/Description	
H. Apply earth and space science facts, concepts, principles, theories and models, including: 1. Structure of the earth system:	Candidate Proficiencies
2. Earth's history;	
3. Earth in the solar system;	
4. Energy in the earth system;	
5. Geochemical cycles;	
6. Origin and evolution of the earth system; and	
7. Origin and evolution of the universe;	

Course #, Title, and Credits	Course Assessment(s)	Key Program Assessment(s)	Content Knowledge	Pedagogical Knowledge	Skills	Dispositions	P-12 Student Learning
Bio 317 Ecology and Field Biology (3) Geog 281 Physical Geography and Geology (4)	Test, Lab Test	Bio 317 Final Exam	X X		X X		

Standard/Description									
 Establish connections between the natural and designed world, linking science and technology, including being able to: Plan, create or modify, and evaluate a technological solution to a scientific problem; Describe the relationship between science and technology, including the cyclical relationship for advancement; and Demonstrate an understanding of the interdisciplinary nature of science as it approaches human problems, e.g., engineering, geophysics and biochemistry; 				Cand	lidate Proficie	ncies			
Course #, Title, and Credits	Course Assessment(s)	Key Program Assessment(s)	Content Knowledge	Pedagogical Knowledge	Skills	Dispositions	P-12 Student Learning		
Bio 317 Ecology and Field Biology (3)	Test, Lab		X		X				

Standard/Description	andard/Description								
 J. Apply science concepts, principles, and processes to personal and social decision making, including: 1. Personal and community health; 2. Population growth; 3. Natural resources; 4. Environmental quality; 5. Natural and human-induced hazards; and 6. Science and technology in local, national, and global challenges, and 				Cand	idate Proficie	ncies			
Course #, Title, and Credits	Course Assessment(s)	Key Program Assessment(s)	Content Knowledge	Pedagogical Knowledge	Skills	Dispositions	P-12 Student Learning		
Bio 317 Ecology and Field Biology (3)	Test, Lab	Bio 317 Carbon Footprint Lab	X		X				

Standard/Description							
 K. Demonstrate an understanding of the history and nature of science, including: 1. An understanding of science as a human endeavor, including the ability to: a. Describe significant scientists, including individuals from both genders, and of different races and ethnic groups; b. Describe the societal, cultural, and personal beliefs that influence scientists; and c. Demonstrate the nature and practice of scientists, for example, ethical behaviors, peer review, truthful reporting, public disclosure; 2. The nature of scientific knowledge; and 3. The history of science. 			Candidate Proficiencies				
Course #, Title, and Credits	Course Assessment(s)	Key Program Assessment(s)	Content Knowledge	Pedagogical Knowledge	Skills	Dispositions	P-12 Student Learning
Bio-111 General Biology I (4) Bio 112 General Biology II (4) Bio 208 Genetics (3)	Test, Lab Test, Lab Test,	Bio 111 Final Exam	X X X		X X X		