



**UNIVERSITY OF MARYLAND GLOBAL CAMPUS (UMGC)  
DEPARTMENT OF EDUCATION**

**Conceptual Framework (CF) Alignment:** UMGC’s professional education unit instills in all candidates the belief that all students can learn and learn at high levels, and that they as teachers and teacher candidates are instrumental in ensuring that this learning occurs. This transcript review form is used for MAT admissions in conjunction with Key Assessments 2 – Description of transcript analysis process, which aligns with CF Learning Objective 1: Teaching for Learning – The candidate acts upon academic content, professional and pedagogical knowledge, and understanding of students to maximize student achievement. The use of this transcript review form also aligns with the Department’s Professional Dispositions category 1: Relationship with students through curriculum and instruction.

**MAT TRANSCRIPT REVIEW FORM FOR SECONDARY BIOLOGY,  
7-12 GRADE TEACHER CERTIFICATION – NSTA/NGSS STANDARDS 2013**

<b>NSTA/NGSS Assessment Standards for Certification</b>	<b>Typical Courses Aligned with Standards (Course Samples)</b>	<b>Courses Completed (Include Prefix, Number, and Name)</b>	<b># of Credits</b>
Structure and Function <ul style="list-style-type: none"> <li>• Cells and cell function</li> <li>• Subsystems in the body</li> <li>• Structure of DNA and proteins</li> <li>• Systems that provide specific functions within multicellular organisms</li> <li>• Feedback mechanisms and homeostasis</li> </ul>	<ul style="list-style-type: none"> <li>• Concepts of Biology</li> <li>• Molecular and Cellular Biology</li> <li>• Cell Biology</li> </ul>		

<p>Growth and Development of Organisms</p> <ul style="list-style-type: none"> <li>• Reproduction of animals and plants</li> <li>• Influence of environmental and genetic factors on the growth of organisms</li> <li>• Cellular division (mitosis) and differentiation in producing and maintaining complex organisms</li> </ul>	<ul style="list-style-type: none"> <li>• Molecular and Cellular Biology</li> <li>• Cell Biology</li> <li>• Advanced Cell Biology</li> </ul>		
<p>Organization for Matter and Energy Flow in Organisms</p> <ul style="list-style-type: none"> <li>• Role of photosynthesis in the cycling of matter and flow of energy into and out of organisms</li> <li>• Rearrangement of food through chemical reactions forming new molecules that support growth and/or release energy</li> <li>• Photosynthesis</li> <li>• Amino acids and/or other large carbon-based molecules</li> <li>• Cellular respiration</li> </ul>	<ul style="list-style-type: none"> <li>• Molecular and Cellular Biology</li> <li>• Botany</li> <li>• Introduction to Plant Biology</li> </ul>		
<p>Information Processing</p> <ul style="list-style-type: none"> <li>• Sensory receptors in the brain</li> </ul>	<ul style="list-style-type: none"> <li>• Fundamentals of Human Anatomy and Physiology</li> <li>• Neurobiology</li> </ul>		
<p>Interdependent Relationships in Ecosystems</p> <ul style="list-style-type: none"> <li>• Effects of resource availability on organisms and populations of organisms in an ecosystem</li> </ul>	<ul style="list-style-type: none"> <li>• Biology and Society</li> <li>• Ornithology</li> </ul>		

<ul style="list-style-type: none"> <li>• Predictive patterns of interactions among organisms across multiple ecosystems</li> <li>• Carrying capacity of ecosystems at different scales;</li> <li>• Factors affecting biodiversity and populations in ecosystems of different scales</li> </ul>			
<p>Cycles of Matter and Energy Transfer in Ecosystems</p> <ul style="list-style-type: none"> <li>• Cycling of matter and flow of energy among living and nonliving parts of an ecosystem</li> <li>• Cycling of matter and flow of energy in aerobic and anaerobic conditions;</li> <li>• Mathematical of the cycling of matter and flow of energy among organisms in an ecosystem</li> <li>• Role of photosynthesis and cellular respiration</li> </ul>	<ul style="list-style-type: none"> <li>• Biology of Organisms</li> <li>• Biophysics</li> </ul>		
<p>Ecosystems Dynamics, Functioning, and Resilience</p> <ul style="list-style-type: none"> <li>• Effect of changes to physical or biological components of an ecosystem on population</li> <li>• Design solutions for maintaining biodiversity and ecosystem services</li> <li>• Complex interactions in ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>• Ecology</li> <li>• Life in the Oceans</li> <li>• Wildlife Ecology</li> </ul>		

<ul style="list-style-type: none"> <li>• Reducing the impacts of human activities on the environment and biodiversity</li> </ul>			
<p>Social Interactions and Group Behavior</p> <ul style="list-style-type: none"> <li>• Role of group behavior on individual and species' chances to survive and reproduce</li> </ul>	<ul style="list-style-type: none"> <li>• Developmental Biology</li> <li>• Primitive Behavior &amp; Ecology</li> <li>• Biology and Society</li> </ul>		
<p>Inheritance of Traits</p> <ul style="list-style-type: none"> <li>• Effect of structural changes to genes (mutations) located on chromosomes</li> <li>• Asexual and sexual reproduction</li> <li>• Role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring</li> </ul>	<ul style="list-style-type: none"> <li>• General Genetics</li> <li>• Heredity &amp; Human Affairs</li> </ul>		
<p>Variation of Traits</p> <ul style="list-style-type: none"> <li>• Inheritable genetic variations</li> <li>• Variation and distribution of expressed traits in a population</li> </ul>	<ul style="list-style-type: none"> <li>• Race, Genome, &amp; Human Evolutionary Theory</li> <li>• Population Genetics</li> <li>• Complex Traits and Evolutionary Biology</li> </ul>		
<p>Evidence of Common Ancestry and Diversity</p> <ul style="list-style-type: none"> <li>• Fossil records</li> <li>• Anatomical similarities and differences among modern organisms and between modern and fossil organisms</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction to Evolution</li> <li>• Molecular Evolution</li> </ul>		

<ul style="list-style-type: none"> <li>• Embryological development across multiple species</li> <li>• Common ancestry and biological evolution</li> </ul>			
<p>Natural Selection</p> <ul style="list-style-type: none"> <li>• Effects of genetic variations of traits on population increase and some individuals' probability of surviving and reproducing in specific environments</li> <li>• Technologies that have changed the way humans influenced the inheritance of desired traits in organisms</li> <li>• Process of evolution primarily resulting from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment;</li> <li>• Advantageous heritable traits</li> </ul>	<ul style="list-style-type: none"> <li>• Evolutionary Biology</li> <li>• Extreme Animal Adaptations</li> </ul>		
<p>Adaptation</p> <ul style="list-style-type: none"> <li>• Natural selection</li> <li>• Changes in environmental conditions that may result in (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction to Evolutionary Anthropology</li> <li>• Genomics of Adaptation: A Modern Look at Adaptation</li> </ul>		

<ul style="list-style-type: none"> <li>• Impacts of human activity on biodiversity</li> </ul>			
<b>Biogeology</b> <ul style="list-style-type: none"> <li>• Simultaneous coevolution of Earth's systems and life on Earth</li> </ul>	<ul style="list-style-type: none"> <li>• Ecology for a Crowded Planet</li> </ul>		
<b>Natural Hazards</b> <ul style="list-style-type: none"> <li>• Influence of the availability of natural resources, occurrences of natural hazards, and changes in climate on human activity</li> </ul>	<ul style="list-style-type: none"> <li>• Conservation Biology and Policy</li> </ul>		
<b>Human Impacts on Earth's Systems</b> <ul style="list-style-type: none"> <li>• Relationship among the management of natural resources, the sustainability of human populations, and diversity</li> <li>• Technological solutions that reduce impacts of human activities on natural systems</li> </ul>	<ul style="list-style-type: none"> <li>• Biological Responses to Climate Change</li> <li>• People, Plants, and Pollution: Introduction to Urban Environments</li> <li>• Techniques in Biotechnology</li> </ul>		
		<b>Total Credits:</b>	

**Note:** Applicants may qualify to enter the MAT program with a content specialization in Biology if they have an undergraduate major in the certification area, or if they have completed 30 credit hours of coursework in Biology.

### Secondary Biology, 7-12 Grade Teacher Certification

Full standards are available at NSTA: <https://ngss.nsta.org/>